

CHILD DEVELOPMENT



The contents of this number include studies of approach to music in children; of visual discrimination; of assurance and skill in children; of diseases of childhood; habit formation and hygiene.



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CHILD DEVELOPMENT

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The Rôle of Pitch Level and Pitch Range in the Singing of Preschool, First Grade, and Second Grade Children

MELVIN S. HATTWICK

PROBLEM AND EXPERIMENTAL PROCEDURE

THE principal problem of this investigation was to determine the mean pitch level and mean pitch range used by preschool, first grade, and second grade children when voluntarily choosing and singing any song. Two questions are allied to this: (1) After a known amount of practice will children sing in the pitch range and pitch level of the practice period, when started on the correct pitch? and (2) How closely do the mean pitch levels and ranges in the group singing compare with the same songs as printed in the songbooks?

Apparatus and technique

A late model Ediphone was used as a recording instrument. It was demonstrated before the preschool group by a five-year-old child to whom the experimenter had given previous instructions. After singing into the horn the child told the group to listen and the song would come out of the horn again when Mr. — pushed the lever. Following the short demonstration the children were promised that within a few days each would be given a chance to play the same game and hear his own

voice. The Ediphone was demonstrated individually to the first and second grade children as they were brought into the experimental room.

The Ediphone was chosen for recording songs for several reasons:

1. It is an excellent motivating device to use with children.
2. It is economical of both time and expense.
3. It is simple to operate.
4. It will reliably record pitch changes, as in singing, if properly monitored.

The reliability of the machine as a recording instrument was determined in the following manner. For five successive days the first record made each morning, just as the motor was started, was note G above Middle C blown from a pitch pipe. The motor and cylinder were then run constantly for a period of five minutes, at the end of which time a comparison was made of the tone on the cylinder and the tone of the pitch pipe. Data show that after a five minute period the tone had changed to G \sharp , a semitone higher. The motor and cylinder were then run for another five minute period, but further checking revealed no appreciable change. In view of this, it was the practice to run the

motor and cylinder each morning for a period of not less than five minutes before recording any songs.

As a further check, the pitch pipe tones were recorded both before and immediately after each child's performance. In transcribing data these pitches were constantly used as reference points. The reliability in transcribing records from cylinder to specially prepared blanks as obtained from two transcribers after considerable training was found to be $.96 \pm .003$.

Subjects. The subjects used in the voluntary singing series were 37 four and one-half to six-year-old children from the preschool laboratories of the Iowa Child Welfare Research Station at the State University of Iowa, and 30 first grade and 28 second grade children from the University Elementary School of the State University of Iowa. The total number for the three groups was 95.

By taking advantage of a training period already in progress in the preschool laboratory, 37 children in the preschool group were also available as subjects for a study of singing in which the amount of group practice was known.

VOLUNTARY SINGING: AMOUNT OF PRACTICE UNKNOWN

As each child was brought into the experimental room and seated before the Ediphone, the experimenter said:

"Now, I want you to think of the song you like best, the one you can sing best, and after I get the horn ready I'll let you sing into it." (To the First and Second Grade children the experimenter added, "I'll show you how the machine works afterwards.")

"Then after you're through singing I'll turn the lever and you can hear yourself sing." The experimenter then busied himself for a few moments until the child appeared ready, at which point he said, "Ready? That's fine. Now stand up straight and sing into the horn the very best you can."

Just as the child was brought into the room, the experimenter had recorded the tone A above Middle C on the Ediphone cylinder. Immediately after the child finished, the tone of A was again recorded.

Results

Figure 1 pictures the mean pitch levels used by these groups when singing songs of their own choosing at any musical level they wished. Table 1 shows that the pitch levels for the three groups are practically the same (E-, E-, E+), the difference in any case being less than a semitone. Throughout this study a negative (-) or positive (+) sign after a letter indicates that the means fall slightly below or above the pitch indicated, but closer to this particular pitch than any other.

Figure 1 shows that the pitch ranges become slightly wider and higher on the scale in going from preschool to second grade. However, the ranges for the three groups differ by slightly more than one whole tone from preschool through second grade (table 1).

When the pitch levels and ranges for these groups are compared with the pitch levels and ranges for these same songs as they are printed in songbooks for children, it is seen that both mean pitch levels and mean ranges as sung are significantly lower on the scale than

they are printed (fig. 1 and table 1). With the exception of the preschool children, however, the mean ranges in first and second grade children use approximately the same range in semitones as is found in the printed song-



FIG. 1. THE MEAN PITCH LEVELS AND RANGES AS SUNG, AND AS PRINTED IN SONGBOOKS AND PRESENTED IN THE MUSIC PERIOD

TABLE 1

A comparison of the pitch levels and ranges as sung voluntarily by preschool, first grade, and second grade children and as presented in the music period by the music teacher

SONGS	PITCH LEVEL		PITCH RANGE		
	Mean	S.D.†	Mean, semitone values	Mean, musical score	S.D.†
Preschool					
All Songs (as sung*)	E-	3.52	8.23	B ₁ to G	2.68
All Songs (as presented*)	A#+	3.83	10.45	F to E ¹	3.26
Cobbler (as sung*)	D+	2.66	4.91	B ₁ to E-	0.91
Cobbler (as presented*)	C# ¹ -	1.72	5.00	A to D ¹	
Baa, Baa (as sung*)	E	3.62	8.30	C- to G#+	1.34
Baa, Baa (as presented*)	C ¹ +	2.82	9.00	G to E ¹	
First grade					
All Songs (as sung*)	E-	3.88	9.81	A# ₁ to G#-	3.17
All Songs (as presented*)	A#-	3.47	10.54	E+ to D# ¹	2.48
Second grade					
All Songs (as sung*)	E+	4.21	10.36	B ₁ to A+	2.64
All Songs (as presented*)	A#	3.45	10.29	F to D ¹	2.01
I Am An Indian (as sung*)	F-	3.27	9.17	C to A#	3.06
I Am An Indian (as presented*)	A	4.03		E ^b + to E ¹	

* Middle C is designated as C; octaves above as C¹, C², C³, etc.; octaves below as C₁, C₂, C₃. A negative (-) or positive (+) sign after a letter indicates that the means fall slightly below or above the pitch indicated, but closer to this particular pitch than any other.

† All figures are in semitone values.

semitones are not significantly different. In other words, although all the children sing at a significantly lower pitch level in voluntary singing, the

books. The preschool children sing with a significantly narrower range than is found in the printed forms.

It is interesting to note that only 5

of the 95 children sang songs which the music teacher could not identify as having been introduced in the groups at one time or another. The fact that over 93 per cent of the songs were probably learned in school is an indication of the influence of musical education received in these early grades, as contrasted to that obtained elsewhere. Of the 45 different songs chosen, 3 of them, "Baa, Baa, Black Sheep," "I Am A Cobbler," and "The Indian," comprise 28 per cent of all the singing. Table 1 compares the mean ranges and pitch levels of these songs with the pitch levels and ranges for the three songs as printed. In the first grade no individual song was chosen by more than two children. The interesting point in this comparison lies in the fact that even in such a small percentage of cases as this the mean pitch levels remain much the same as for the larger number of cases and are significantly lower than the printed form. The mean pitch ranges are also seen to be significantly lower on the musical scale, but are not significantly narrower in semitone values.

One of the songs, "I Am A Cobbler," deserves particular attention when compared with the printed and taught form. It was practiced frequently in the music period, was a favorite with the children, and was always presented by the teacher in the range



Eleven children elected to sing this song voluntarily. Table 1 shows that they sang with a mean range of 4.91

semitones as contrasted to the 5.00 semitone range used by the teacher and printed in the text. However, there is a striking difference of range placement on the musical scale as is indicated here:



These children sang far below the range supposedly used in the music period. The highest note sung by any child on this particular song was lower than the lowest note contained in the written form. This is due largely to the narrowness of the range of the song, but nevertheless is a striking example especially when one compares the pitch levels in the two instances.

Printed song:



Song as sung:



It will be noted that there is almost an octave difference.

INSTRUCTIONAL SINGING: AMOUNT OF PRACTICE KNOWN

A group of 37 four and one-half to six-year-old children was given twenty-eight group practice trials for a period of 14 days (two trials per day). On the fifteenth day each child was taken into an experimental room and told that he would be allowed to sing into

the little horn again and afterwards listen to his song. The experimenter continued, "And I noticed yesterday that you were singing a song about a horse, or pony, or something? Do you remember it? Well, let's sing that one. Here's where it starts (blowing a pitch pipe note of the practice level) and it goes like this—'Hop, hop, hop' (experimenter singing). Now let's start here. Hm-m-m-m (starting pitch

possible to test them on a lowered pitch as had been done before. The results obtained after 28 and 48 group practices are summarized in table 2 and figure 2. By the time of the forty-eighth practice period 25 of the children were still available on whom it was known that each had had the same amount of practice. Twelve of them had to be dropped from the records because of absences.

TABLE 2

Influence of group practice on pitch level and range for preschool children

SONGS	PITCH LEVEL		PITCH RANGE		
	Mean	S.D.†	Mean, semitone values	Mean, musical score	S.D.†
As Sung After Twenty-Eight Practices*.....	D # +	3.97	9.96	A # to G # -	2.38
As Sung After Twenty-Eight Practices, but Lowered to D (Five Semitones Lower)*.....	D #	3.79	10.16	A # ₁ to G #	2.18
As Sung After Forty-Eight Practices*.....	E +	3.96	10.31	B ₁ + to A # -	2.80
As Presented in Practices*.....	A # -	3.45	12.00	D to D ¹	

* Middle C is designated as C; octaves above as C¹, C², C³, etc.; octaves below as C₁, C₂, C₃. A negative (-) or positive (+) sign after a letter indicates that the means fall slightly below or above the pitch indicated, but closer to this particular pitch than any other.

† All figures are in semitone values.

which the experimenter held until the child got it)."

After the child had finished the song the experimenter said, "That's fine. Now before we listen to it we'll sing it once more like this (the experimenter sounded D above Middle C). It goes like this—'Hop, hop, hop.'" The experimenter again hummed the starting note until the child had it.

After 26 more group practice trials over a succeeding two weeks period the children were tested as before, except that on this second series it was not

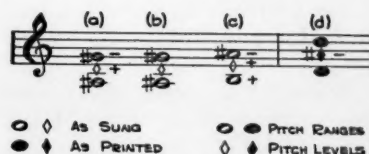


FIG. 2. THE MEAN PITCH LEVELS AND RANGES USED BY PRESCHOOL CHILDREN FOR A SONG, "THE PONY"

(a) After twenty-eight group practices, (b) after twenty-eight practices but started at a level five semitones below the level presented in practice, and (c) after forty-eight group practices; (d) range and pitch level as presented and as printed.

Results

All of the children knew the words of the song after 28 group practice trials, but few sang the melody correctly. The ability to sing correctly is a separate problem being investigated at the present time, and is not reported in this paper. One fact may be pointed out, however. Three children sang the melody perfectly in the key proposed by the teacher in the group practices. When the pitch level was lowered to D, seven children sang the song perfectly. This, of course, is only an indication of a possible trend and only holds for those children who could sing perfectly after 28 practices.

Table 2 shows that although every child was given the starting pitch as presented in the practice period, the mean pitch level for the group was D# + after 28 group practices. When this starting pitch was lowered five semitones below that presented in the practice sessions, the mean pitch level for the group was still D#. After 48 group practices over a period of five weeks the mean pitch level was E+. This is only one semitone higher than the level used after 28 practices, and is still a significantly lower pitch level than that presented in the practice periods.

In general, five weeks of consistent group practice on any one song is a longer period of time than is usually given. The music teacher for these groups told the experimenter that the song used in the group practices, although carried along as a regular part of each music period, was being presented over a longer period of time than was ordinarily used for songs.

Tables 1 and 2 show rather strikingly that the mean pitch level used by the preschool group when singing a "practiced" song after 28 and 48 practices is practically the same as that used by kindergarten, first grade, and second grade children in voluntary singing. Even though prompted to sing at a specific pitch level these children "lapsed," as it were, into the same mean pitch level in which they had voluntarily sung. Whether they could not or would not sing at the higher levels is another problem, but these data show that they did not.

Table 2 indicates that the mean ranges after 28 and 48 practice trials were narrower than taught during the practice periods. The children sang with a mean range 2.04 semitones narrower than taught after 28 trials, and 1.69 semitones narrower after 48 trials. The first of these ranges is significantly different and smaller than that taught, although the trend is toward a wider and more accurate range with continued practice.

It is also interesting to note that for a miscellaneous group of songs the preschool group sang with a mean range approximately two semitones narrower than the mean range found in the songbooks.

Although we find that the pitch level is lower and the range in semitones is narrower for preschool children after both known and unknown amounts of practice than those proposed in songbooks, the same picture does not appear for first and second grade children in voluntary singing. In these cases it is true that the mean pitch levels are significantly lower. But in pitch range the first grade

children sang less than a semitone narrower than the mean of these songs in songbooks, although the range placement in the songbooks is much higher. The second grade actually used a mean range slightly wider than the means for those written songs (table 1). In these groups the children sang significantly lower in pitch level, yet used approximately the same range in semitones as shown in the songbooks and presented in the music period.

PITCH LEVEL AND RANGE IN RECENT SONGBOOKS FOR CHILDREN

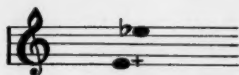
A sampling of 350 kindergarten, first grade, and second grade songs from eight representative songbooks (1, 2, 3, 4, 5, 6, 9, 14) in use at these levels shows the following facts:

1. Six per cent of the songs contain one or more pitches of F¹.

Throughout this article Middle C is designated as C; octaves above as C¹, C², C³, etc.; octaves below as C₁, C₂, C₃, etc. Thus F¹ is F in the first octave above Middle C.

2. Forty-two per cent of the songs contain one or more pitches of E¹.
3. Forty-seven per cent of the songs contain one or more pitches of E^{b1}.
4. Over 81 per cent of the songs contain one or more pitches of C¹.
5. Only 8 per cent of the songs contain one or more pitches of Middle C.
6. Forty-seven per cent of the songs have ranges of F to E^{b1}.
7. Only 8 per cent of the songs have ranges of Middle C to C¹.

The mean pitch level for this sampling is A[#] —, and the mean range in semitones is 10.91. The range is indicated by the following:



Authors and arrangers of children's songs have made the statements given below in several editions of their works. They are stated rather positively, yet with no references to research material.

1. "The approximate compass during the first year (Grade I) should be from E^b, first line, to F[#], fifth line of the treble clef." (2)
2. "A suitable compass for Kindergarten and First Grade is from E (first line on the treble staff) to F (fifth line)." (6)
3. "The range of the child's voice is from Middle C to E, an octave above, or even G. Many songs are pitched too low and should be transposed to a higher key." (12)
4. "During the past twenty or thirty years much light has been cast upon the training of children's voices, and it is perhaps not likely that we will ever return to their methods in force when music in the public school meant singing exclusively in the key of C, with all the results technical and vocal, of this mistaken practice." (11)

With the almost unanimous agreement of authors, music supervisors, and music teachers on the subject of the vocal singing range of the child, songbooks have been published accordingly. When compared with experimental findings, the data given in this section and in figure 3 tend to question these hitherto almost unanimous agreements and to point out the need for further work along these lines.

PITCH LEVEL AND RANGE OF VOLUNTARY AND INSTRUCTIONAL SINGING COMPARED

The range in semitones for this sampling (10.91) of songs from songbooks and the range used by the first and second grades (9.81 and 10.36) are comparable. The chances are ninety-six in one hundred that the difference between the sampling and

those found in songbooks (figures 1 and 3), these differences are more clearly seen.

A partial explanation for these differences between printed and sung data can be found by any trained observer who will "listen in" on music periods for children of these ages. Many of the voices will be heard singing below the pitch level proposed and sung by the music teacher. These are

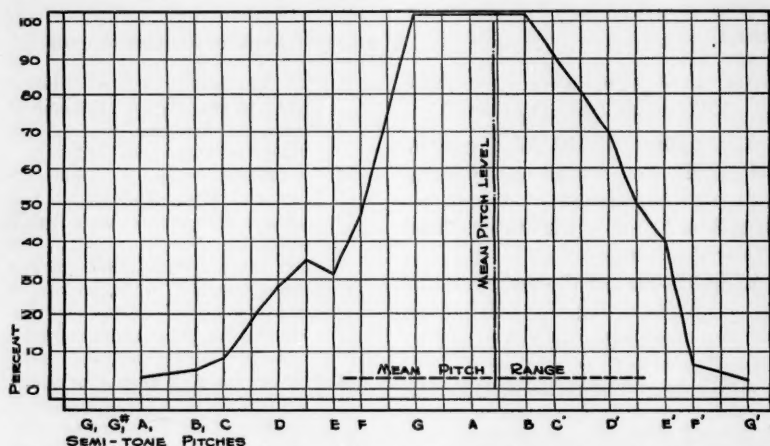


FIG. 3. The heavy line shows the percentage of songs which contain pitches from A₁ to G₁, a distance of approximately two octaves. For example, F₁ above Middle C is found in 47 per cent of the songs, while E₁ almost an octave higher is found in 42 per cent of the songs written for children. This sampling was taken from eight representative songbooks for kindergarten, first grade, and second grade, and represents a total of 350 different songs. The mean pitch level and mean pitch range for the sampling are shown in the dotted lines.

first grade is greater than zero, but there is no significant difference between the sampling range and the range of second grade. However, figure 1 shows that the position of the ranges on the musical staff are significantly different.

The pitch levels of the two grades and the sampling are significantly different. If we compare graphically the pitch levels found in singing with

not the outstanding voices, and because of this fact there is a tendency to miss them. As a rule, the attention is placed on the melody with the result that deviations are not noticed in many cases. Another factor which makes it difficult to notice these deviations is that although the voices sing below the pitch level of the teacher they often follow the rise and fall of her voice even though the pitch is incorrect.

It is, therefore, altogether possible and probable that some of the children actually practiced the song over the period of 48 group practices at a lowered pitch level than that presented by the teacher. An indication that this may be the case is suggested in the fact that although only three children sang the song perfectly after 28 group practices in the level proposed by the teacher, seven children could sing it perfectly when the level was lowered five semitones below that presented in the practice period.

There are few children who actually sing these songs as they are printed in the textbooks, which have been found to contain relatively high pitch levels. When lower pitch levels were used, it seemed that a greater number of children sang more easily and accurately and still retained the same variability of range suggested by the textbooks. In view of these facts, it seems evident that for group singing the lowering of pitch level would be of a twofold advantage:

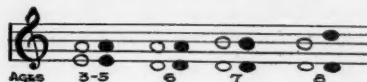
1. It would make it possible for all children to sustain an interest in an activity they could do.
2. It would place the songs within the ability of practically all children.

SUMMARY AND CONCLUSIONS

It was the purpose of the present investigation to study the pitch level and pitch range in the singing voices of preschool, first grade, and second grade children. A survey of the literature reveals little data which are directly related to the problem of how the child sings at the early age levels. However, songbooks for these ages are

numerous and are practically the only guides in teaching young children. This study has attempted to find out what the average child in the group does in actual singing.

A few researches have been published on the general subject of the child's singing voice. Paulsen (9) in 1895 tested 4,944 children between the ages of six and fifteen years on their ability to sing high and low notes with ease. Fourteen years later Gutzmann and Flateau (7) examined 575 children, found their data in agreement with Paulsen's, and added more for ages from birth to the sixth year. A summary of findings for ages three through eight are given in the following graph taken from Weld (13). Half notes indicate the range for boys' voices, quarter notes for girls':



Williams (15), in a recent monograph, states that "the natural range of the child's voice falls between the octave of Middle C to C above."

Jersild and Bienstock (8) in a study of three-year-old children state:

The findings with regard to pitch differ somewhat from the usual statements with regard to the voices of young children. The claim is usually made that the songs for young children should fall within the compass extending from E, first line, to E fourth space. The authors have been unable to find published experimental data to support this claim . . . when actual tests were given, the notes Middle C, and D above Middle C (both of which are below the first line E), were sung considerably more readily than C and D an octave higher, and very few children sang the E and F (an octave above Middle C) which have been regarded

as well within the child's voice . . . (some) children who had previously remained silent made efforts to sing after the songs had been transposed to a lower key.

Summary of experimental procedure

Ninety-five children between four and one-half and eight years of age chose 47 different songs and sang them at any pitch level they wished. A smaller group of 37 children between the ages of four and one-half and six years were given 48 practices of a song and were tested after the twenty-eighth and forty-eighth practices. At each test the child was aided in starting the song at the same pitch level and in the same manner as it had been started in the practice period. All songs and pitch pipe tones were recorded on an Ediphone and later transcribed. All of the children were in daily attendance at the preschool laboratories of the Iowa Child Welfare Research Station and the first and second grades of University Elementary School, State University of Iowa.

Conclusions

The specific findings of this study are:

1. The mean pitch level used by preschool, first grade, and second grade children, when singing voluntarily at any pitch level they wished, is significantly lower than the pitch level for these same songs as they are printed in songbooks for these ages.

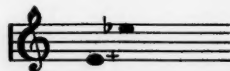
2. The mean pitch range in semitone value for these same groups is significantly smaller for the preschool children, but not so for the first and

second grade children, than that found in the songbooks for these levels.

3. After 48 group practices on one song, the mean pitch level for the preschool children is significantly lower than that presented by the teacher during the practice period. The mean pitch level used after 48 periods is not significantly different from that used by these same children when singing voluntarily any song they wished in any pitch level they chose.

4. After 48 group practices on this same song the mean range for this group is significantly lower on the musical scale than that presented in the practice period, but not significantly smaller in semitone value.

5. A statistical survey of children's songs shows that the mean pitch level is approximately A \sharp for preschool, first grade, and second grade children, and that the mean pitch range is approximately 10.5 semitones, as shown below:



With the exception of the kindergarten children, the first and second grade children sang in a semitone range similar to that of the survey. Comparison of mean pitch levels, however, shows that all groups actually sing significantly lower with known and unknown amounts of practice than they are taught to sing according to the written songs.

6. These data indicate that children sing at a pitch level of their own choosing.

REFERENCES

- (1) COLEMAN, SATIS N., and THORN, ALICE G.: *Singing time: Songs for nursery and school*. New York: John Day Co., 1929, pp. 48.
- (2) DANN, HOLLIS: *First year music: Rote songs for kindergarten and first year*. New York: American Book Co., 1914, pp. 112.
- (3) DANN, HOLLIS: *Second year music*. New York: American Book Co., 1915, pp. 111.
- (4) FORESMAN, ROBERT: *A child's book of songs*. New York: American Book Co., 1928, pp. 98.
- (5) FORESMAN, ROBERT: *First book of songs*. New York: American Book Co., 1925, pp. 124.
- (6) GIDDINGS, THADDEUS P., EARHART, WILL, BALDWIN, RALPH L., and NEWTON, ELBRIDGE W.: *Introductory music*. Boston: Ginn & Co., 1923, pp. 176.
- (7) GUTZMANN, HERMANN: *Physiologie der Stimme und Sprache*. Braunschweig: Friedrich Vieweg und Sohn, 1909, pp. x, 208.
- (8) JERSILD, ARTHUR T., and BEINSTOCK, SYLVIA F.: *The influence of training on the vocal ability of three-year-old children*. *Child Develop.*, 1931, 2, 272-291.
- (9) MCCONATHY, OSBOURNE, MIESSNER, W. OTTO, BIRGE, EDWARD BAILEY, and BRAY, MABEL E.: *The music hour in the kindergarten and first grade*. New York: Silver, Burdett, 1929, pp. viii, 208.
- (10) PAULSEN, E.: *Über die Singstimme der Kinder*. *Pflüger's Arch.*, 1895, 61, 407-476. Cited by Weld, Harry P.: *The mechanics of the voice and its hygiene*. *Ped. Sem.*, 1910, 17, 143-159 (p. 159).
- (11) SMITH, ELEANOR: *The Eleanor Smith music course. Manual, Primer, Books 1 to 4*. New York: American Book Co., 1908-1911 (*Manual*, pp. 128; *Primer*, pp. 177; *Book 1*, pp. iv, 112; *Book 2*, pp. iv, 144; *Book 3*, pp. 199; *Book 4*, pp. 265).
- (12) THORN, ALICE G.: *Music for young children*. New York: Scribner's Sons, 1929, pp. xv, 158.
- (13) WELD, HARRY P.: *The mechanics of the voice and its hygiene*. *Ped. Sem.*, 1910, 17, 143-159 (p. 156).
- (14) WIER, A. E. [Arranged by]: *Songs the children love to sing*. New York: D. Appleton, 1916, pp. 256.
- (15) WILLIAMS, HAROLD M., SIEVERS, CLEMENT H., and HATTWICK, MELVIN S.: *The measurement of musical development*. *Univ. Iowa Stud.*, *Stud. in Child Welfare*, 1932, 7, no. 1, pp. 191.

Visual Discrimination in Pre-school Children

ROBERT H. PECKHAM

VISUAL discrimination and visual acuity have often been confused.

The problem of definition has been discussed by the author previously (1). Theoretically visual acuity should be defined as the psychological aspect of the resolving power of the refracting and sensitive elements in the visual sense organ. That is, visual acuity is the physiological and optical limit of the eye in resolving two points, subject to the mere report of the sensation by the subject, and is directly dependent upon the perfection of the refractive system (cornea, lens, and humors) and the areal distribution of the light sensitive elements in the retina, (rods and cones). Unless made with an excised eye, however, an estimate of visual acuity must depend upon more than these optical parts. Its estimation becomes subject matter to the psychologist just as soon as reports and protocols of the subject become the data upon which the estimation is based. The estimation, therefore, depends upon the previous experience of the subject, upon his ability to describe his sensations, and upon the perspicacity of the examiner in interpreting his subjects' reports.

For this reason a measure of a subject's "visual acuity" is in reality a psychological estimate of his visual discrimination, and should be treated as such. For this reason we have used

the term "visual discrimination" as being more exact.

The problem becomes doubly acute when estimating the limit of visual discrimination in young children. Unless they are familiar with the names of letters, the use of the usual Snellen Type is precluded. And even with subjects who are, the hesitation dependent upon doubt in naming is often interpreted as due to faulty vision. Later, and in adults, when the names and forms are very familiar, the subject's correct guessing often results in an estimation that is far higher than the true condition should reveal.

In order to avoid the dangers adhering so subtly and so irremovably to letter tests, various "illiterate" tests have been designed. Geometric figures have been used, and pictures of familiar objects. Objections must be raised to most of these systems; they are either too complex and result in confusion, or too simple, and result in chance successes. Many of them are improperly designed and result in completely false estimates.

In spite of the further disadvantage of the false assumption of one minute as the criterion of normal vision, an assumption made upon irrelevant data, and upon far too few cases, the block letters used in the Snellen Test Type, and its subsequent modifications, are extremely useful because they can be

adapted to the expression of estimates in fractional form, and because they are so universally employed. We shall therefore describe the system more fully.

It depends upon two major assumptions.

1. That the normal two-point visual limen is that separation subtending an angle of one minute of arc.
2. That this angular limen is the same for any distance from the eye.

There are definite objections to these assumptions. The most obvious is the fact that the norm has never been properly established. Experiments which, however numerous, are inadequate because made under different conditions, have lead to the conclusion that the visual two-point limen is one minute of arc measured from the nodal point of the eye (2). No consideration has been taken of the fact that visual limens for two horizontal lines, or two vertical lines, or a broken line, are very different from this value. Furthermore, there is no factual proof that this limen is the same for various distances. And still further, there is no data to determine whether or not the visual two-point limen is the same binocularly and monocularly, in "emmetropic" eyes.

The Snellen letters, extended from these assumptions, are made up of elements which subtend one minute at various distances (fig. 1). The test is usually made at ten or twenty feet. "Visual acuity" is determined as the ratio between the distance at which the smallest letters read by the subject subtend the one minute angle,

and the distance at which the test was made. Thus, if a subject can read at best only those letters which subtend one minute at 40 feet, and the test is made at 20 feet, his "visual acuity" is expressed by the fraction $20/40$ or by the decimal fraction 50 per cent. This is most often expressed as 50 per cent normal. The system is untrue, in that the normals for letter reading have not been determined, but has the double advantage of being comprehensible to the subject, and of scaring him into buying a pair of glasses.

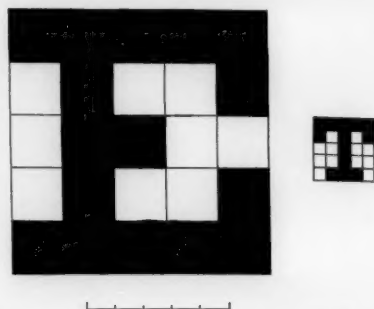


FIG. 1. The large *E* is the "200 Foot Letter," and the *T* is a "50 Foot Letter." The scale represents 5 cm. in the original size.

APPARATUS

In defining and designing a scheme for estimating visual discrimination in children, the author modified a technic invented by George W. Bailey, optometrist, of Cortland, New York and through collaboration with the latter and with R. M. Peckham, optometrist, of Rochester, New York, the present apparatus was designed.

Because of the usefulness of the Snellen units, these were incorporated into the design of geometric figures

and simple pictures of commonplace objects, which were constructed of minute-angle elements and posted at 10 feet from the subjects.

Most of the difficulty in such estimations is in language, but Bailey has devised a method for reduction of language almost to its elimination. After the procedure is initiated, oral

of the geometric figures, the legs and tails of the animal figures, etc.), were the same width, $\frac{1}{4}$ inch. These little black cut out figures are placed in a white tray about 9 inches by 11 inches, which contains narrow shelves for holding the figures, and which is inclined at about 80° from the horizontal. The tray is placed on a low table before

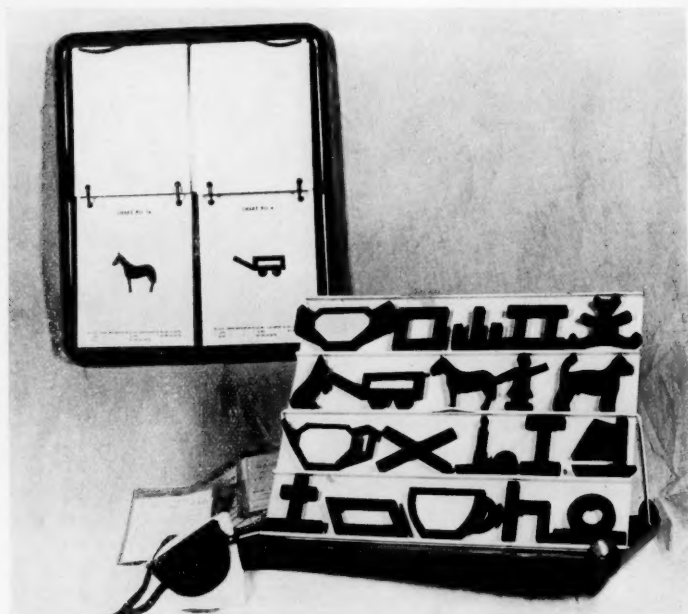


FIG. 2. ASSEMBLED TEST MATERIAL

language is dispensed with, and gestures on the part of subject and observer suffice.

Having designed the pictures and having drawn them to the proper scale, exact enlargements were made and cut of a patent fibrous material $\frac{1}{4}$ inch thick. All of these replicas were enlarged so that their elements (the lines

the child, who is seated on a low and comfortable chair.

The cards bearing the designs, the tray and the cut out models are arranged to fold within a metal case 12 inches by 10 inches by 2 inches, rendering the material portable. For older children a bandage is provided to occlude one eye in making a mo-

nocular test. With younger children it was found more convenient to hold a hand before one eye as the bandage proved annoying. Figure 2 is a photograph of the assembled test material.

The test includes simple geometric figures, figures of animals, and figures of familiar objects. All 20 figures are somewhat conventionalized, and have their duplicates in the blocks placed before the subject. The test was designed for 10 feet because it was found that 20 feet proved to confuse the children. The figures are not repeated in the test, and the following distances (representing the denominator of the Snellen units) were used:

2 designs for	100 feet or	10 per cent
1 design for	66 feet or	15 per cent
1 design for	50 feet or	20 per cent
2 designs for	40 feet or	25 per cent
2 designs for	30 feet or	33 per cent
4 designs for	20 feet or	50 per cent
2 designs for	15 feet or	67 per cent
2 designs for	12.5 feet or	80 per cent
4 designs for	10 feet or	100 per cent

When used at 20 feet these fractions are doubled, and when used at 5 feet they are halved, thus, estimates can be made from ten to one hundred per cent in Snellen units when the test is used at 10 feet, and by changing to five or twenty feet in special cases the range of estimation is from five to two hundred per cent in Snellen units.

PROCEDURE

With older children and adults the mere verbal instruction to "choose the figure just like the one over there" is sufficient. With illiterates, foreigners and the deaf or dumb gestures indicating the likeness quickly establishes the understanding of the discrimina-

tion to be made. In these cases all the cut-outs are placed in the tray at once. With the younger children however, a more lengthy procedure is necessary. The first picture, a large Teddy Bear, is presented by an assistant, who is working with the cards 10 feet from the table at which the child is sitting. The observer himself is at the side of the child, and asks him to "find one just like that." Only two or three blocks remain in the tray, the identical one and somewhat similar ones.

When 3 figures seemed confusing, only 2 were used, and each correct response, in the upper brackets, was repeated without intervening error, to avoid chance guesses; the positions of the 2 cut-outs were varied between choices.

An attempt is made to liken the procedure to a game, and if no response is elicited the child is asked to name the object on the card. If no name is given, the teddy-bear cut-out is referred to. Usually some name is given, as "Teddy" or "Bear," or "Baby." The name is not commented upon, other than to ask again for a name for the object on the card. If there is no response, he is led over to the assistant, who points out the similarity between the cut-out and the object saying, "see this 'Teddy', it is just like that one you have." The game is repeated with other of the larger objects until the child chooses the correct block.

It very often happens that the child picks up the wrong one, fingers it and returns it, choosing the right one. And almost always the choice is not made definitely until the block has

been picked up and felt, especially if the child is very young.

Once the discrimination is established further instruction becomes unnecessary; the blocks are successively changed until either the smallest picture is correctly designated or until failure seems due to inability to see. This point is not always easy to find unless the larger discriminations have been well established, and is not determined until a repetition of the same error is made.

The bandage is now placed over one eye, or a hand held before it, and the test is repeated. This time only the largest two or three figures are used, and the intermediate ones skipped. In this series no attempt was made to measure discrimination beyond 10/10 or 100 per cent in Snellen units. This could have been done by moving the test back to 20 feet.

The "best score" was that which the child made without error, or, in cases in which the error was corrected later, the score preceding the final error. When no error was made the estimate was set at 10/10 or 100 per cent although a better score may have been possible. With the youngest children, as is recorded below, only the binocular test was made. Trouble arose due to the restraint of holding one eye closed or to dwindling attention and tendencies to play.

Save for the first naming, none further was required, and names applied were received with interest but not emphasized. Usually, unless visual difficulties were discovered, the test took about ten minutes for each child.

Subjects. Nineteen children were

tested, ranging from twenty-one to sixty-two months in age. The writer was assisted by Dr. W. M. Cook, supervisor of The Child Institute, Johns Hopkins University, with whom the children were well acquainted and at ease. With these children the estimates of visual discrimination given in table 1 were made. These estimates have been expressed in the comparative Snellen units, for comparison with the usual ophthalmic procedure.

TABLE 1

SUBJECT	AGE	BOTH EYES		RIGHT EYE	LEFT EYE
		months	per cent	per cent	per cent
1	21	21	33		
2	28	28	80		
3	28	28	100		
4	32	32	100	100	100
5	39	39	100	100	100
6	39	39	100	80	80
7	41	41	80	80	80
8	41	41	100	100	80
9	43	43	67	67	67
10	45	45	100	100	100
11	47	47	100	100	100
12	47	47	100	80	100
13	48	48	100	80	80
14	52	52	100	100	100
15	59	59	100	100	100
16	60	60	100	100	80
17	61	61	100	100	100
18	62	62	100	100	100
19	62	62	100		

It has been previously assumed in ophthalmic practice that children under four and one-half to five years are not amenable to the usual procedure in estimates of visual discrimination, and that the expected normal for such children should be very low, nearly 50 per cent of the adult "normal." Some few patient workers specializing in children have raised exception to

this rule of thumb procedure, and the results of this short investigation support the exception. Of 15 children under sixty months, 11 show an estimated visual discrimination of 100 per cent or better with binocular vision. This in itself indicates 2 conclusions: that the test, devised in a way understandable to children, can be applied to them with reliability, and that the rule of thumb assumption that young children do not have good vision is erroneous.

With the children with 100 per cent vision, as before stated, no attempt was made to investigate further. Of the others, with lower estimates, subjects 7, 9, and 13 were referred to eye specialists for further examination. In the case of subject 9, this decision was obvious, and in the cases of subjects 7 and 13, extra-factual items of apparent difficulty accompanied by real effort to see influenced the decision. Subjects 1 and 2 may be considered either too young to be amenable to the test, or to be limited by maturation to the deficiency in visual discrimination expressed in the data. Since some slight coöperation and at-

tention is required, in spite of the simplification of the test, the probability is that both the test and the eyesight were at fault.

SUMMARY

A visual test consisting of a modification of the familiar Snellen Test Type, whose deficiencies are discussed, into a form to which children and illiterates are amenable, and which to a great extent reduces the problems of language instruction and previous letter learning, was given to 19 preschool children ranging from twenty-one to sixty-two months of age. The results show that the test is applicable to children who are two and a half years of age or older, and partly successful with those younger. Of the 19 tested, 15 had an estimated visual discrimination equal to or better than that ascribed by the Snellen technique to "normal" adults. This study indicates that children under five years of age may be tested for visual acuity with accuracy approximate to that of tests of adults and that these children have visual acuity similar in range to that of adults.

REFERENCES

- (1) PECKHAM, R. H.: A definition of perception. *Am. Jour. Optometry*, 8, 1931, 323-326.
- (2) HELMHOLTZ, H. VON.: *Handbuch der Physiologischen Optik*. Trans. ed. J. P. C. Southall, published by Optical Soc. America, 1924, 2, p. 36.

Comparative Frequency of Certain Communicable Diseases of Childhood in Nursery School and Non-Nursery School Children

RUTH UPDEGRAFF

THE present study was undertaken in an attempt to justify or refute the frequently heard statement that children of preschool age are more likely to be and stay healthy if they remain at home than if they attend nursery school. It had as its purpose the investigation of the relative frequency of five communicable diseases of childhood among nursery school and non-nursery school children. All children included were residing in Iowa City, Iowa, the former group attending the preschool laboratories of the Iowa Child Welfare Research Station.

The diseases studied were chicken pox, measles, mumps, scarlet fever, and whooping cough. Diphtheria, smallpox, and typhoid were not included since possible immunization against these diseases constituted a variable factor and since no cases developed in children attending the laboratories. There has been no occurrence of poliomyelitis; however, since the laboratories are not open during August and September, two of the months during which this disease is most prevalent, its inclusion was thought inadvisable.

Information concerning the daily health of 328 children from two to six

years of age was available from records kept by the nurse who inspected the laboratory children daily. Due to the fact that many of these children attended school for more than one year and the children are treated by age groups in the statistical analysis, the recorded data show 470 children.

There were three control groups, Groups A, B, and C. Group A was made up of children who entered the preschool laboratories much later than their second birthdays for whom information was available concerning communicable diseases contracted previous to enrollment in the nursery schools. There were 68 such children, constituting 125 cases of two-, three-, and four-year-old children. The background of this group was similar to that of the laboratory children. Group B contained certain children of preschool age who did not attend the laboratories but who were regularly brought to a measurements clinic at the Iowa Child Welfare Research Station. There were 28 such children, making 46 cases over a period of their second and third years. These children had home backgrounds comparable to those of children in the laboratories.

Children of the general Iowa City

population constituted Group C. Records of the city clerk of Iowa City, based upon physician's report of disease to the civic authorities, furnished data for this group. The files of the clerk's office were checked for a period corresponding exactly with the dates for which information concerning the nursery school children was available. These children represented a wider variation of home background than Groups A and B. The per capita occurrence of the five diseases was computed from the total Iowa City population at these ages as yielded by the school census.

Records for all four groups cover exactly the same period of time, 59 months between September, 1926 and February, 1933. The following tabulation indicates the number and age distribution of children used in this study:

GROUP	AGE			
	2 years	3 years	4 years	5 years
Preschool Laboratory...	96	142	111	121
Group A.....	66	40	19	—
Group B.....	28	18	—	—
Group C.....	1192	1300	732	736

It is probable that the records for Groups A and B are accurate. This is not true of the information concerning Group C, due to parents' desires to avoid quarantine. An estimate of their accuracy was made possible by ascertaining how many of those diseases actually contracted by children attending the laboratories were recorded in the city clerk's office. Out of a total of 46, only 8 were contained in the records: none of the 12 cases

of whooping cough, only one of the 13 cases of chicken pox, 7 of the 18 cases of measles, and neither of the 2 cases of mumps. The single case of scarlet fever could not be found in the clerk's records. In 7 cases of measles and in 1 chicken pox case, it was discovered that a sibling was reported as having the disease. Judging from the accuracy of the reported 46 cases, it may be estimated that only 1 case out of 5.75 actually occurring was reported to the clerk's office.

Table 1 compares the number of diseases contracted by the laboratory children with those contracted by Groups A and B. Evidently the 5 diseases are less common in children attending the laboratories than in children who do not attend.

A comparison of laboratory children with the general population of Iowa City children would be spurious, inasmuch as it is evident that only a small fraction of the actual cases is reported. The proportion found, 1 in 5.75, is probably fairly dependable due to the fact that the time sample is adequate. There is no reason to suppose that parents of the laboratory children were laxer in this regard than other parents. It is necessary, then, to assume that the same discrepancy might be found in the reporting of the entire population. To make the desired comparison, the reported cases in the clerk's records were multiplied by 5.75 in an attempt to approximate the true frequency of the diseases in the general population.

Table 2 gives the results of comparisons based upon this estimate. The lower frequencies occur in the laboratory group and are noticeably smaller

TABLE 1

Comparison of per cent of two-, three-, and four-year-old preschool laboratory children contracting diseases with the per cent contracted by Group A, Group B, and Groups A and B together

GROUP	FRE- QUENCY OF DIS- EASE	TOTAL CASES	AGE							
			2 years		3 years		4 years		All ages	
			Cases	Dis- eases per 100 chil- dren	Cases	Dis- eases per 100 chil- dren	Cases	Dis- eases per 100 chil- dren	Dis- eases per 100 chil- dren	
Chicken pox										
Preschool Laboratory....	11	349*	0	0.0	6	4.2	5	4.5	3.2	
Group A.....	7	125	5	7.6	0	0.0	2	10.5	5.6	
Group B.....	6	46†	1	3.6	0	0.0			13.0	
Groups A and B.....	6	152†	6	6.4	0	0.0			3.9	
Measles										
Preschool Laboratory....	10	349	1	1.0	5	3.5	4	3.6	3.5	
Group A.....	9	125	5	7.6	2	5.0	2	10.5	7.2	
Group B.....	1	46	0	0.0	0	0.0			2.2	
Groups A and B.....	7	152	5	5.3	2	3.4			4.6	
Mumps										
Preschool Laboratory....	1	349	1	1.0	0	0.0	0	0.0	0.2	
Group A.....	0	125	0	0.0	0	0.0	0	0.0	0.0	
Group B.....	0	46	0	0.0	0	0.0			0.0	
Groups A and B.....	0	152	0	0.0	0	0.0			0.0	
Scarlet fever										
Preschool Laboratory....	1	349	0	0.0	1	0.7	0	0.0	0.2	
Group A.....	2	125	1	1.5	0	0.0	1	5.3	1.6	
Group B.....	0	46	0	0.0	0	0.0			0.0	
Groups A and B.....	1	152	1	1.1	0	0.0			0.7	
Whooping cough										
Preschool Laboratory....	8	349	3	3.1	5	3.5	0	0.0	2.3	
Group A.....	10	125	5	7.6	3	7.5	2	10.5	8.0	
Group B.....	5	46	5	14.3	0	0.0			10.9	
Groups A and B.....	8	152	5	5.3	3	5.2			5.3	
All diseases										
Preschool Laboratory....	31	349*	5	5.2	17	11.9	9	8.1	8.8	
Group A.....	28	125	16	24.2	5	12.5	7	36.3	22.4	
Group B.....	6	46†	6	21.3	0	0.0			13.0	
Groups A and B.....	27	152†	6	29.3	5	8.6			17.7	

* Two-, three-, and four-year-olds.

† Only two- and three-year-olds.

when all age groups are considered together.

A study of the individual cases occurring in laboratory children reveals that 26 of the entire 46 were first or only cases. Obviously in these instances infection was met outside the laboratories. Siblings or playmates were sources of infection for ten additional cases. There remain only 10 children, therefore, who may have found infection in the laboratories. It was not possible to check further on these ten.

the school group. It was found that the average number of days the 46 children were absent before diagnosis was 6.6. Evidently the school was not allowing children with communicable diseases to attend.

It is apparent from the above, as well as from the fact that less than a fourth of the children could have been exposed in the laboratories, that a school group so conducted is a more favorable environment to prevent contagion than the home ordinarily is.

TABLE 2

Comparison of per cent of preschool laboratory children contracting diseases with estimated per cent of diseases contracted by Iowa City children

AGE	NUMBER		CHICKEN POX		MEASLES		MUMPS		SCARLET FEVER		WHOOPING COUGH		ALL DISEASES	
	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City	Preschool Laboratory	Iowa City
<i>years</i>														
2	96	1192	0.0	9.6	1.0	12.5	1.0	0.5	0.0	1.4	3.1	7.7	5.2	31.8
3	142	1300	4.2	4.9	3.5	17.7	0.0	1.3	0.7	2.6	3.5	4.0	11.9	30.5
4	111	732	4.5	9.4	3.6	18.8	0.0	0.8	0.0	3.1	0.0	3.9	8.1	36.1
5	121	736	1.7	15.6	6.6	48.4	0.8	0.8	0.0	2.3	3.3	4.7	12.4	71.8
2 to 5	470	3960	2.8	9.1	3.8	22.1	0.4	1.0	0.2	2.3	2.6	5.2	9.8	39.8

It seemed desirable to know whether the laboratories were discovering sickness early enough to eliminate those children who were sources of infection in order to guard the health of other members of the group. The 46 cases were studied to discover the amount of time elapsing between the child's last day of attendance at school and the diagnosis of infection. Since several of these diseases have recognizable early symptoms, even though they are not specifically for the disease alone, it is frequently possible to keep children exhibiting the symptoms from

The frequency of occurrence of cases of chicken pox, measles, mumps, scarlet fever, and whooping cough in 470 records of two- to five-year-old nursery school children was compared with the frequency of the same diseases of children of like age and environment not attending nursery school. It was found that the preschool children consistently contracted fewer of these diseases. This fact is interpreted as indicating that the nursery school which furnishes adequate daily health inspection reduces the incidence of infection.

Group Play and Quarreling Among Preschool Children

ELISE HART GREEN

IN AN observational study of friendship and quarreling forty 30-second observations of the type of activity, the companions, the degree of social participation according to the categories used by Parten (1), and whether or not the social contact resulted in a quarrel were obtained on the children in the nursery school of the Minnesota Institute of Child Welfare.¹ The results were first grouped on a large master sheet.

MATERIAL ON PLAY GROUPS

The characteristics of the preschool play groups which make up the second part of this thesis were studied by obtaining average and percentage frequencies for various items of group play and quarreling. The results were first grouped on a large master sheet. For those children on whom it was impossible to obtain the full number of observations, scores in each item were pro-rated on the basis of 40 observations. In order to increase the number of observations for each child, the records were gone through again, and a tally placed beside the name of

a child every time his number was found under "companions" and every time he was mentioned as being involved in a quarrel.

The rank order correlation between the frequency of group play as indicated by the results from direct observation and that indicated by the results from incidental observation was $.84 \pm .034$. A similar correlation, worked between the frequency of quarrels for the direct and incidental observations, yielded a coefficient of $.62 \pm .04$. Since the number of children played with and the number of children quarreled with, as obtained from the incidental observations on each child, was approximately equal to the number played with and the number quarreled with as obtained from the direct observation, the combining of incidental and direct scores virtually doubles the total number of observations. Hence, the Spearman-Brown correction formula is applicable to these correlations. When so treated the two coefficients become .91 and .765 respectively. Since both these coefficients are high, the data from the two sources were combined. Throughout the study, unless otherwise stated, all computations are based on the combined scores.

¹ For a more complete description of the method used in this study see the author's *Friendship and Quarrels in Preschool Children*, Child Development, 1933, 4, No. 3.

CHARACTERISTICS OF PRESCHOOL PLAY GROUPS

The results in this part of the study are based on the raw scores, i.e., on the number of observations in which the children were solitary, the number

TABLE 6

Age and sex differences in group play and quarreling

Average of all forty observations

AGE RANGE	GROUP PLAY A	QUARRELS A
54-65	79.5	10
42-53	65.4	12.5
30-41	50.4	13.3
18-29	35	9.8
Boys	59.2	13.4
Girls	61.0	10.2

in which they played with other children, and the number in which they quarreled. After equating the scores

tions the child played with one companion, in 17 per cent with two companions, and in 8 per cent with three or more children.

There was a total of 231.7 quarrels. These quarrels were noted in 14.5 per cent of the observations. In 25 per cent of the observations in which group play occurred, a quarrel arose.

Age differences. From table 6² it is apparent that the amount of group play increases regularly with age. These results also agree with the fact that friendship indices increase regularly with age. The results were analyzed to find the frequency of participation in groups of various sizes by children of different ages. These data are presented in table 7.

As a corollary to the fact that older children play with other children the greater part of the time, table 7 shows that the 2-year-olds play alone 61.5

TABLE 7

Age and sex differences in types of group play direct results

Averages for all forty observations

AGE RANGE	SOLITARY		NUMBER OF TIMES 1 CHILD		NUMBER OF TIMES 2 CHILDREN		NUMBER OF TIMES 3 OR MORE	
	Average	Per cent of observations	Average	Per cent of observations	Average	Per cent of observations	Average	Per cent of observations
54-65	12.1	30.3	11.9	29.8	8.8	22	7.3	18.3
42-53	14	35	14.7	36.8	7.9	19.8	3.3	8.3
30-41	20.8	52	13.2	33	4.7	11.8	1.3	3.3
18-29	24.6	61.5	11.1	27.8	3.7	9.3	0.7	1.8
Boys	17.7	44.5	13.0	32.5	6.3	15.8	3.0	7.5
Girls	16.1	40.3	13.4	33.5	6.9	17.3	3.6	9.0

of those children on whom it was impossible to get 40 observations, the results show that in 67.8 or 42 per cent of the observations the play was solitary. In 33 per cent of the observa-

per cent of the time. The 3-year-olds play alone 52 per cent of the time, the 4-year-olds only 35 per cent of the

² The tables are numbered continuously with those in the former article.

time, and the 5-year-olds 30.3 per cent of the time. The same tendency for solitary play to decrease with age is observed when the first and second 20 observations are considered separately. Interest in other children makes its most marked development between the ages of three and four years. This agrees with Parten's findings.

It is also clear that the size of group in which the child plays increases as he grows older. This is shown most clearly in the largest group. The

third age group is the most quarrelsome. The data also show an increase of quarrels with age up to 3 years followed by a steady decrease.

A study of age differences in behavior during quarrels is given in table 8. It leads to the conclusion that when averages are considered the 3-year-old group starts the most quarrels, the 2-year-old group is more passive than the other groups, and the 4-year-olds are the most retaliative. When these averages are translated into percentages of quarrels for

TABLE 8

Age and sex differences in initiative in quarrels direct and incidental results combined
Per cent of all forty observations

AGE RANGE	AGGRESSOR		PASSIVE		RETALIATIVE	
	Per cent of quarrels	Average	Per cent of quarrels	Average	Per cent of quarrels	Average
54-65	56.1	5.6	24.9	2.5	18.9	1.9
42-53	52.4	6.6	23.9	2.9	23.8	3.0
30-41	50	6.7	29.4	3.9	20.6	2.8
18-29	21.9	2.2	50.7	4.9	27.3	2.7
Boys	48.2	6.5	30.0	4.0	21.8	2.9
Girls	50.4	5.1	26.8	2.7	22.7	2.3

5-year-olds played with three or more children in 18.3 per cent of the observations, the 4-year-olds in 8.3 per cent, the 3-year-olds in 3.3 per cent, and the 2-year-olds in only 1.8 per cent. This trend is also found in the number of times the child played with two children. Single companions are most characteristic of the 4-year-olds. The tendency to play with one child increases up to the age of 4, and then declines at the 5 year level. This is probably because 5-year-olds are becoming more interested in larger groups.

Quarrels. Table 6 reveals that the

that age group, different trends become apparent. The per cent of quarrels in which the child is the aggressor increases with age; the 2-year-olds are aggressors in a considerably fewer number of their quarrels than is the case in the three upper age groups. The 2-year-olds are also much more inclined to be passive in their quarrels than are the older children. They are slightly more retaliative as well.

The 5-, 4-, and 3-year-olds are more often aggressors in their quarrels, the 2-year-olds are most often passive.

Behavior during quarrels. The per-

centage of the quarrels for each age group in which verbal, physical and spatial behavior occurred, is presented in table 9. In the case of the verbal and physical behavior, the age groups naturally separate into two parts; the upper two ages are more likely to employ verbal behavior in their quarrels, the two younger groups are more inclined to employ physical behavior. The per cent of each age group showing spatial behavior is very small, prob-

theory that girls become socialized at an earlier age than boys.

Quarrels. Boys are consistently more quarrelsome than girls. It also agrees with the conclusions drawn from a study of the quarrelsomeness indices. According to the averages boys start more quarrels, are passive more often, and also retaliate more than girls do. When percentages are considered, however, we find that girls start slightly more of their quarrels, and are slightly more retaliative in them than the boys are in theirs. Girls are slightly more inclined to use verbal arguments in quarrels, and boys are more inclined to use physical force.

TABLE 9
Age and sex differences in behavior during quarrels

AGE RANGE	PER CENT VERBAL	PER CENT PHYSICAL	PER CENT SPATIAL
Age differences			
54-65	67.5	22.2	2.2
42-53	75.3	35.4	3
30-41	46.1	63	6
18-29	27.1	18.8	0
Sex differences			
Boys	55.5	64.6	5.3
Girls	62.5	53.3	4.2

ably because such things as making faces are not noticed by the observer when children are hitting each other, or are engaged in any physical strife.

Sex differences in group play. As in the case of the friendship indices, the sex differences in group play are small and inconsistent. It would seem that the girls participate in group play slightly more than the boys do. Boys play alone slightly more than girls; girls play with 1, 2 and 3 companions more than boys do. All these differences are too slight to be conclusive, but again they favor the

TYPES OF ACTIVITY AS A FACTOR IN FRIENDSHIP AND QUARRELS

It will be recalled that on the original record sheet, the type of activity in which the child was engaged at the time of the observation was recorded. These activities were later grouped into various categories which are presented in table 10. The names of the categories in some cases are not very apt, but were chosen merely for the sake of having a simple descriptive label.

The category of dramatic play included such items as playing house, playing train, and playing barber shop. Bodily activity involving apparatus consisted of such items as playing on the swing, on the jungle-gym, and on the rocking horse. Under meddlesome and destructive activity were grouped such activities as pounding on the piano, throwing blocks, and playing with water. The sand play included playing in the sand, shoveling, and playing in the snow. The

category called quiet intellectual pursuits consisted of such activities as looking at pictures, talking, and singing. The construction work included sawing and block piling (using the large building blocks); the seventh, helping, meant cleaning up and collecting crayons. The category of activity without apparatus consisted of such items as running, walking and hopping; toy play was comprised of such activities as play with train, toy phone, doll, and drum. Fine manipu-

The categories are arranged in order according to the coöperation involved. Dramatic play is seldom carried on without a companion. It may be, however, that the little girl at play with her doll, or the boy with his train, is dramatizing subvocally, but the observer has no way of knowing this.

Bodily activity with apparatus, destructive and meddlesome activity, sand play, quiet intellectual pursuits, construction work, and helping all involve coöperation to about an equal

TABLE 10
Types of activity as a factor in friendships and quarrels

ACTIVITIES	PER CENT WITH COMPANIONS	PER CENT INVOLVING QUARRELS	QUARRELS AS PER CENT OF PLAY WITH COMPANIONS
1. Dramatic Play.....	93	20	21.6
2. Bodily Activity with Apparatus.....	64.5	12.95	20.1
3. Destruction and Meddling.....	63.5	15.8	25
4. Sand Play.....	62.5	23.6	37.6
5. Quiet Intellectual Pursuits.....	61.5	12.5	20.4
6. Construction Work.....	60.5	20.2	33.6
7. Helping.....	55.5	11.1	20
8. Bodily Activity Without Apparatus.....	48.5	9.5	19.5
9. Play with Toys.....	47.5	15.6	32.8
10. Fine Manipulation.....	42.3	9.8	23.3
11. Inactive Pursuits.....	33	10.8	32.8

lation included drawing, playing with peg board, stringing beads and modeling clay; the inactive pursuits were such activities as standing, sitting, looking out the window, and watching other children.

An attempt was made to find which activities required the most coöperation (i.e. play with other children) which led to the most quarrels, and in which the relation between quarrelsomeness and friendship was highest. The resulting percentages are given in table 10.

degree. About sixty per cent of the time these activities are observed, two or more children are playing together. In the other 40 per cent of the observations they represent solitary activities. Activities without apparatus, play with toys, fine manipulation, and inactive pursuits are more characteristic of solitary play than of coöperation.

The activity which elicited the most quarrels in relation to the number of times it was participated in was sand play. In almost a fourth of the time

it was observed quarrels arose. Construction work and dramatic play resulted in conflict about one-fifth of the time. Play with toys, and destructive and meddlesome activity led to quarrels in about one-sixth of the observations. The remaining activities produced unpleasant relationships in one-eighth or less of the observations.

When the frequency of quarreling is divided by the frequency of companionship for each activity, the conflict hazard of the categories is distributed in a somewhat different way. Sand play remains the most contentious type of activity. Construction work, play with toys, and inactive pursuits result in quarrels in a third of the time they are engaged in by two or more children. Destructive and meddlesome activity, and fine manipulation result in quarrels about one quarter of the time they are engaged in by two or more children. Dramatic play, quiet intellectual pursuits, helping and activity either with or without apparatus, are the least likely to induce quarrels, when participated in by two or more children. Since playing house makes up a large part of dramatization, and

since girls are most likely to be found in this activity, this possibly accounts for the low conflict hazard.

SUMMARY

The amount of group play increases with age.

The size of group in which children play increases with age.

Three-year-old children are the most quarrelsome.

Dramatic play is the most social activity in which these children engaged.

Sand play is the most quarrelsome activity in which these children engaged.

Theoretical importance can be attached to:

- a. The earlier socialization of girls.
- b. The channelization of friendships with age.
- c. The positive relationship between friendships and quarrelsomeness.

REFERENCE¹

- (1) PARTEN, MILDRED: Social participation among preschool children. *J. Abn. and Soc. Psychol.*, 1932.

¹ A complete list of references was appended to the former article.

A New Approach to Music for Young Children¹

IRENE HISSEM

THE present study was designed to develop a more simple and adequate approach to the teaching of music to nursery school children by reducing music to its elements; namely, tone and rhythm. The procedure involved training in pitch and rhythmic discrimination. The aim was not to train the child to compose or to create, but to appreciate and to reproduce if music proved a satisfying form of self-expression.

The problem was undertaken because, after four year's experience as a kindergarten teacher, the writer found that in general, the approach to musical training for young children was too complex. Music should be presented in its most simple form both in tone and rhythm, and when the child's capacity and interest permit, should gradually grow to a more complex form. Also, the writer felt that there should not be so many musically uninterested children. Music should and would hold interest for many more children if it were more easily understood. Mursell and Glenn (5) state that the skills of hearing and rhythmic grasp must be taught with apprecia-

tion as a motive and goal. "Everyone needs music! The more highly endowed need it to satisfy self-expression, and the less well endowed need it to enrich."

Jersild (3) states, "In so far as training forstalls the development of habits which might interfere with the development of skills of a later time, the child will obtain an enduring advantage from training at an early age."

It is understood that all children, because of individual differences, can not be brought to an equal musical level along a given pattern. Equally as important as the fostering of musical ability however, is the arousing of interest in music and its appreciation.

"The singing ability of the child will depend upon the accuracy with which he distinguishes between different tones, plus the control he gains in reproducing these tones." (8).

Little children learn to sing through observation and imitation. Even the youngest child copies tones of voice, sounds and rhythms. Young children do not have enough experience with pure tone; most of their auditory stimuli experiences are in the form of noise and are too complicated to regard as tone.

With these points in mind, the following procedure for the presentation

¹ A preliminary report covering work carried on in the Nursery School, Department of Child Development, Mills College, during the school year, 1932-33.

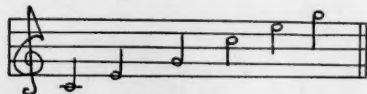
of music reduced to its elements of tone and rhythm, was worked out for nursery school children.

PROCEDURE

The experiment was carried on over a period of eight months, from October 1932 to May 1933. The subjects were 27 children ranging in age from twenty-one months to fifty-four months during the first semester, and from twenty-six months to fifty-nine months during the second semester. In most cases the same children were used throughout the entire time. The children in attendance during the school year were given 20 lessons; those attending one semester received 10 lessons.

For the most part the children as a group were above average intelligence. They were from good homes and, with one exception, from homes that did not offer a particularly musical environment.

The instrument used was a scientifically tuned Deagon dinner chime, or gong, based on a *C* tonic chord.



It was necessary that the instrument used be pure in tone in order to aid in the establishment of pitch recognition. This particular type of instrument was used because the child could play it himself. It was hoped that through the combination of both playing and singing all self-consciousness on the part of the child would disappear.

A model of tone and rhythm in the most simple terms was presented to

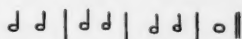
the child who reproduced it as accurately as possible both vocally and by playing it on the gong. This involved interest, attention and careful listening on the part of the child.

The gong was placed on a small nursery school table in the play-room. During the bad weather when the group was forced indoors, the instrument was moved to one of the adjoining rooms where the lesson would not be disturbed. It was thought that by having the music period in the Play-room where the children felt at home, greater self-confidence would be gained. Music was also a part of the regular nursery school procedure and not something strange and apart.

The children were taken one at a time, the child sitting at one side of the table in a nursery school chair of the correct height. The experimenter sat opposite with the gong between them. From the child's side of the table the gong was placed so that the tones were in the right order, middle *C* at the extreme left with the higher notes running toward the right.

The child's natural pitch was determined first and all work was started from that point. The following rhythmic patterns were presented:

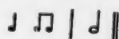
1. A slow, even, half-note pattern.



2. A fast, even, eighth-note pattern.



3. A combination of slow and fast.
(Last measure varied to fit name of child.)



4. Various other more complex patterns after the above three were mastered.

The words, or "songs," to the rhythmic patterns were varied to continue interest. However, in the beginning of the work the words were:

1. *Bell Song*. Ding-dong, ding-dong, ding-dong-ding. (This, because of the childrens' interest in the Campanile on the campus.)
2. *Rain Song*. Pitter-patter, pitter-patter.
3. Good morning, John. (Name of child.)
4. Any number of short sentences which in most cases, were original with the child.

After the child had gained more confidence in the use of his voice, he would "compose" his own words to fit even the most simple rhythms, (1 and 2).

All of the "songs" were given on one tone at first, the child's natural tone. As he gained control, the child progressed to another tone, either up or down, which ever seemed easier for him. This procedure was repeated on the new tone. When two tones had been successfully sung individually, the "songs" were broadened by the use of two tones rather than one. During this program the child played his own accompaniment while singing.

Besides the "songs," the names of the tones were learned, *do* (middle *C*), *me*, *sol*, *do*, *me*. The children liked playing a tone and would ask, "What is its name?" Soon the game was reversed, the teacher asking the name

and the child answering with the syllabic names of the tones, according to location and not sound.

The music period was never forced upon the child but was always optional. The interest and desire to participate on the part of the child were most pleasing. During the entire experiment there were only two children who, "Didn't want to play music." These two refused several times which was surprising as they happened to be two of the most musical of the group. One was from the older nursery school group and the other from the younger. It was decided that the material was too easy and therefore uninteresting to them and that they needed to progress faster than the other children. They learned "harder songs" and at this time the game of musical conversations was evolved. These were carried on about any topic which arose. The teacher and child sang on a given pitch instead of just talking. Both children enjoyed this and, by interspersing it with the set material, the ends were gained and the child was given a satisfying experience as well. Needless to say the children did not refuse again.

Many times the children would ask to be allowed to play and to sing. As it was only possible to take one child at a time, there were often children waiting to claim the "next turn."

Primary rhythms and tones were conformed to throughout the year's work, but there were slight variations in the manner of presentation. This was always determined by the age and interest of the child. For example, the manner of presentation to the

child of twenty-three months would necessarily differ from that of the forty-eight month old child.

The larger intervals were tried first, *5ths*, *4ths*, and octaves before *3rds*. This was because it was believed such intervals would be easier for the children to sing. Particular care was taken to sing softly but clearly, so as not to strain the childrens' voices.

A child was allowed to experiment with the different tones if he were interested, but only after the lesson was over.

RESULTS

Each child used in the experiment showed a keen interest in music since all work began at the point where each child was capable of beginning, his own natural pitch.

Improvement in ability to match tones is shown in tables 1 and 5. A greater improvement is, of course, shown by the group which had 20 lessons than by the group which had only 10 lessons. Growth however, is evident within the group having had five lessons or less (table 5).

Facility in matching rhythmic patterns also increased with practice. Tables 2 and 5 show the improvement after 10 and 20 lessons respectively.

Most significant are the charts showing the sequence of tones combined in 10 and 20 lessons. Table 3 shows the improvement in this ability.

In many cases the syllabic names of the tones were learned. The names, however, were learned in reference to location rather than sound. As greater discrimination in tonal sense was gained, the syllabic names were

attached to sounds as well as locations. Table 4 indicates these results.

Summary of results

1. Tonal results. In totaling the records for the entire eight months, it was found that:

3 children were able to match all 6 tones.

TABLE 1

Number of tones matched after ten and twenty lessons

AGE	NO TONE	C	E	G	C	E	G
After 10 lessons							
months							
26	*						
31	*						
32			*		*	*	
33				*	*		
39		*		*			
39				*	*		
45		*		*			
48		*		*			
48		*					
52		*		*			
54		*					
58		*		*			
After 20 lessons							
29		*	*	*	*	*	*
30		*		*	*	*	
41		*	*	*	*	*	
50				*			
51		*	*	*	*	*	*
55				*	*		
59		*	*	*	*	*	*

4 children were able to match 5 tones.

4 children were able to match 4 tones.

5 children were able to match 3 tones.

14 children were able to match 2 tones.

17 children were able to match 1 tone.

6 children were not able to match any tone.

2. *Rhythmic results.* In totaling the records for the entire eight months, it was found that:

- 3 children could play the entire group of patterns and could also invent patterns for themselves.

TABLE 2

Number of rhythmic patterns matched after ten and twenty lessons

AGE	NONE	NO. 1	NO. 2	NO. 3	NO. 4	INVENTED PATTERNS
-----	------	-------	-------	-------	-------	-------------------

After 10 lessons

months						
26	*					
31		*	*	*		
32		*	*	*		
33		*	*			
39		*	*			
39		*	*			
45		*	*			
48		*	*			
48		*	*			
52		*	*	*		
54		*	*			
58		*	*			

After 20 lessons

29		*	*	*		
30		*	*			
41		*	*	*	*	*
50		*	*	*		
51		*	*	*	*	*
55		*	*	*	*	
59		*	*	*	*	*

- 4 children could reproduce all 4 patterns.

- 11 children could reproduce 3 patterns

- 22 children could reproduce 2 patterns.

- 25 children could reproduce 1 pattern.

- 2 children could not reproduce a given pattern.

3. *Knowledge of names of syllables.*

In totaling the records for the entire eight months, it was found that:

- 2 children knew all syllabic names.

- 4 children knew 5 syllabic names.

- 4 children knew 4 syllabic names.

- 4 children knew 3 syllabic names.

- 8 children knew 2 syllabic names.

- 11 children knew 1 syllabic name.

- 8 children were unable to name any syllabic name.

TABLE 3

Number of combined tones after ten and twenty lessons

AGE	C TO G	C TO C	G UP TO C	G DOWN TO C	C DOWN TO G
-----	--------	--------	-----------	-------------	-------------

After 10 lessons

months					
26					
31					
32					
33					
39					
39					
45	*		*	*	
48					
48					
52					
54					
58	*				

After 20 lessons

29					
30					
41	*	*	*	*	*
50					
51	*	*	*	*	*
55			*		
59	*	*	*	*	*

4. *Combinations of sequences of tones.*

In totaling the results for the entire eight months, it was found that:

- 3 children could make all combinations.

- 3 children were able to make 4 combinations.

- 4 children were able to make 3 combinations.

TABLE 4

Number of names of syllables learned after ten and twenty lessons

AGE	NONE	C	E	G	C	E	G
After 10 lessons							
months							
26	*						
31	*						
32	*						
33	*						
39	*						
39	*						
45	*						
48		*		*			
48		*					
52	*						
54		*		*			
58		*					
After 20 lessons							
29		*		*			
30		*					
41		*	*	*	*	*	
50		*		*			
51		*	*	*	*	*	*
55		*	*	*	*	*	*
59		*	*	*	*	*	*

TABLE 5

Results from children who had five lessons or less

AGE	TONES LEARNED	RHYTHMS LEARNED
months		
27	None	No. 1
33	None	None
37	None	No. 2
38	C	Nos. 1 and 2
50	C, G	Nos. 1, 2 and 3
55	C, G	Nos. 1, 2 and 3
57	C	No. 2
57	None	Nos. 1 and 2

4 children were able to make 2 combinations.

5 children were able to make 1 combination.

14 children were unable to make any combination.

INDIVIDUAL RECORDS

I. M. L. At the beginning of the experiment the child, M. L. was 47 months old. She was given 20 lessons over the period of eight months at the end of which time she was 55 months old.

On October 1, 1932 M. L. received her first lesson. On this day she became acquainted with the instrument and was allowed to play with it without the assistance of formal instruction. At the next lesson Rhythmic Pattern No. 1 was presented to her and was reproduced after two trials. No attempt was made to require vocalization at this early period nor until the child had accustomed herself to both the instrument and the teacher. After the second lesson the child's normal pitch was determined and found to be around G. Rhythm No. 1 was then given on G. She was told to try and sing like the model while playing. The rhythmic response continued to be good, but her reproduction of the tone was wavering and lacked control.

During her next lesson, M. L. successfully repeated rhythm pattern No. 1 and was given rhythm pattern No. 2 which she reproduced well but her vocalization was still poor. On November 9th she had the first three rhythmic patterns. She was given the model of C with the syllabic name *do*, but she responded with the tone E.

November 29. Rhythms 1, 2 and 3. Rhythmic response good, vocalization poor. (Mother visiting—quite self-conscious.)

December 1. Rhythms 1, 2 and 3 on G—both rhythm and tone good. Given middle C and asked to sing *do*. Continued to sing on G.

February 17, 1933. Experimented with all tones and said, "Each one sounds different, doesn't it?" Presented rhythms 1, 2 and 3 on G. Rhythmic response good, but sang on F. Presented middle C, and she sang F. Presented G and she sang good tone.

March 10. Tone was stressed without rhythm. Gave middle C, she sang F. Gave G, and she sang G. Again gave middle C and she sang E. She was then given high C and she sang a very good tone. She then asked the names of the other tones on the gong and played each one as she was told.

March 14. Rhythms 1, 2 and 3 on *G* and gave good response. Presented high *C* and she sang *B*.

March 17. Middle *C* given, sang a high wavering note. She was told to listen carefully and to think what the sound was, suggested that she close her eyes while she listened. Presented *G* which she reproduced, after having closed her eyes first. The middle *C* she reproduced after two trials.

April 7. Before beginning, stressed listening carefully. She was given rhythms 1, 2 and 3 on *G*. She reproduced them well both in tone and rhythm. Presented rhythm No. 1 on middle *C*, she was unable to get a fair tone.

April 10. Middle *C*—sang high wavering tone. *G* was reproduced after three trials. High *C* she sang after two trials. She was told that she could go but she asked if she couldn't sing the Bell Song first. Sang on *G* (her tone much more clear in song than on syllable).

April 22. Two new "songs" on rhythm No. 4 on *G* reproduced successfully. She combined tones *G* and high *C* with syllabic names.

April 24. Sang *G* and high *C*, attempted middle *C* but could not reproduce. Three new "songs," one on *G* and two on combined tones of *G* and high *C*.

May 15. *G* and high *C* successful at first trial. Two new "songs" on *G* and high *C*. Attempted combining high *C* down to *G* but could not, while both could be reproduced separately.

May 22. Middle *C* unsuccessful. Did *G* and high *C* well. Did all rhythms on high *C*. "Song" on combined *G* and high *C*. After three trials was able to combine high *C* down to *G*.

May 30. Same as previous lesson. At the end tried middle *C* and she sang a vague tone.

M. L. showed great ability to grasp the rhythms. Her natural pitch, *G*, was a little higher than normal in reference to the group. It is believed that her tonal range would have widened with more lessons. She was always anxious to have her lesson and her attention was good.

II. T. W. T. W. was next to the youngest child in the nursery school. His age at the beginning of the experiment was 23 months and was 31 months at the end. He did not talk when the experiment began and was saying only a few words when it ended. He had 20 lessons over the experimental period.

At first T. W. would not touch the gong. The tones were played for him, he placed his hands on the bars and stopped the vibration. At the second lesson he was still noticeably shy but took the hammer and played only at hammering on the gong and on the table. This hammering was repeated at the third lesson. At the fourth lesson he took the hammer, played a tone, then lifted up the instrument and looked underneath to see whence the sound came. He was then so pleased with himself that he would smile when he played a tone. Model No. 1 was played for him and he was handed the hammer which he handed back and then got up to go out.

November 8. He experimented very softly, then smiled and looked underneath. Rhythmic pattern No. 1 was played which brought forth the same smile. He then took the hammer and played on the instrument with the wrong end. He then wanted to go out and play.

November 9. Experimented softly (he never pounded). Presented rhythm No. 2 and he responded with rhythmic playing on sound box as well as on tone. He held his hand on the metal strip so as to stop the sound. He was told that by touching the strips it would not play. He then alternated first touching and playing, then not touching and playing. He lacked motor control in that his playing was not well placed. He played all over the instrument.

November 10. (Visitor observing.) Child was very shy. Would not respond.

November 15. Had listened very attentively while previous child had lesson. It was thought that by observation he might better learn what he should do. Presented rhythmic pattern No. 1 on *C*; he gave his first murmuring of anything resembling "song." No rhythmic response, continued experimenting by playing all tones.

December 9. Experimented on tones

with rhythm before a model was given. Presented model No. 1—no definite response. Tried middle *C*, he made no sound but formed *do* with his lips while continuing to play in the same rhythmic fashion.

January 5, 1933. Presented rhythmic pattern No. 1 on *C*. He reproduced pattern but no vocalization. Said, "Bell ring?" and played on all of the notes. Still no vocalization, but very interested, more so than before.

January 9. Wanted to come in with Elizabeth Ann so allowed to come. Listened attentively. When his turn came—no definite response outside of experimental playing.

February 23. T. W. responded with rhythm No. 2 after the pattern had been given him. He had failed to respond to pattern No. 1 given at the same lesson. No vocalization.

February 27. He was given middle *C*, the tone being sung for him. He responded by saying *do* (not singing), and playing it at the same time. Rhythmic pattern No. 1 was given. He responded by playing and saying, "Ding-dong." This showed he was progressing as it was a combination of playing and verbalization.

March 1. Presented middle *C*. He said *do* while playing. He then said, "Bell?" Model 1 was played. He played and said, "Ding-dong."

March 20. Presented rhythmic pattern No. 1. Responded exactly but no vocalization. But after he had finished reproducing the model he said, "Ding-dong." Presented pattern No. 2. Reproduced but no vocalization. Middle *C* played but he did not sing. Visitors then appeared and he would participate no further.

March 23. He was given middle *C* which he reproduced both by singing and playing. Presented pattern No. 1 which he reproduced playing two notes to the syllables "ding-dong" which he said rather than sang. (Played quarter-note rhythm but spoke words according to pattern.) On second trial, the same but vocalized. He was then given middle *C* which he again played and sang.

April 12. Middle *C* was played and he

was asked the name. He said, "Do." Asked him to play and sing, he played but would not sing even after several trials. He then experimented on all tones. He was again asked to play *do* which he did immediately.

April 27. Presented middle *C* and he played but would not sing. Rhythmic patterns No. 1 and 2, played but no song.

May 9. Asked him to play *do* which he did but would not sing. Rhythmic patterns No. 1, 2 and 3. He reproduced 1 and 2 but no vocalization.

T. W. seemed to enjoy greatly both sound and playing. Because the child had not learned to talk, and was limited as to words, his vocal response was limited.

III. J. B. The age of J. B. was 33 months at the first of the experimental period and 41 months at the last. She ranked highest of the group in the mental test. She too, was given 20 lessons throughout the period.

At the first lesson the child experimented as was usual. She was also given rhythmic pattern No. 1 which she could not reproduce. During the second lesson she not only reproduced the rhythm but sang it on middle *C*. At the same time she was given pattern No. 2 which she played but could not sing. She also reproduced the first measure of rhythm No. 3, but did not sing it. At the next lesson she was given middle *C* and she sang the syllable *do* while playing. Reproduced patterns No. 1 and 2. At this time she was brought into an irrelevant conversation so that she might forget the tone she had just reproduced. She was then asked to sing *do* without playing. She sang *D* and then of her own accord went down to middle *C*. The tone was then checked upon the gong and found to be correct. For the next three lessons the procedure was about the same. During the middle of the third, she sighed and said she was tired and asked to leave.

February 24. Rhythms 1, 2 and 3 on *G*. Asked to sing *do* without first playing it and she sang *G*. She was told she could go and she said, "I'll do some more tomorrow."

J. B. began to lose interest in the lessons

and even refused to come in on several different occasions. It was believed that the material was too easy for her.

March 23. She experimented on the instrument for a time and then announced that she wished to play a high one which she did, playing the highest *G*. She said "Listen how long it rings," and tried this several times. The teacher then sang on *G*, "Do you think it's going to rain?" and she repeated this "song." The teacher responded with "No, I don't," on middle *C*. J. B. repeated exactly. Then she was asked on *G*, "Do you think the sun will shine?" She answered, "Yes, I do," on *C*. She was then asked to play middle *C* and sing *do*, which she did.

April 10. J. B. sang two songs that she had learned at home, *The Merry Winds Heigh-ho* and *The Owl*. She then sang middle *C* and *G* correctly. Then she combined three tones, *C*, *G*, and back to middle *C*. She then recalled the conversational singing of her last lesson and sang on *G*, "Do you think it's going to rain?" She then sang middle *C* without the tone first being played and when checked it was found to be correct.

April 21. Middle *C* and *G*—correctly. Combined these two tones on rhythmic pattern No. 1 to words, "singing, singing, singing." (This was after model.) Gave model of same tones on rhythmic pattern No. 4 the words being, "The birds are singing." She then showed remarkable association by saying, "I know a song about birds," and repeated it.

April 23. She was asked for middle *C* without model which she gave perfectly. Gave models of all rhythmic patterns on *C* and *G*. She played high *C* and said, "That is too high." Attempted to sing but couldn't reach it. She then experimented on all tones and again sang middle *C* correctly without the model first.

May 16. Sang tones correctly and successfully combined both low and high *C*.

The child J. B. continued to combine different tones, successfully singing *C*, *E*, *G*, *C*, and *E*. She also made up many original "songs" or sentences which she used as "songs."

SUMMARY

In order to develop a simpler approach to music for the young child, a scientifically tuned chime or gong based on the *C* tonic chord was used. A model of tone and rhythm in the simplest terms was played and the child was expected to reproduce it as accurately as possible. This involved attention and careful listening on the part of the child. Children whose parents considered them monotones have learned to recognize and repeat middle *C* and have shown ability to repeat simple tonal and rhythmic patterns.

The "songs" on one tone and the simple rhythmic patterns presented at first were gradually varied by the addition of other tones and more complex patterns. The procedure also involved determination of the child's natural pitch and then working from that point both up and down to increase discrimination. Through this method the child was encouraged to compose his own "songs" or to carry on a musical conversation. In so doing, a child loses all self-consciousness, gains confidence in the use of his voice, and finds song a natural mode of expression.

CONCLUSION

It may be concluded that both tonal and rhythmic discrimination improve with definite training. Since only 2 children out of a group of 12 were able to combine tones, it would seem that the usual nursery school songs are too difficult for accurate reproduction by children from two to five years of age.

With practice, accuracy in the reproduction of tones increases.

It is interesting to note that while they were mastering the material presented, six of the children developed a discrimination of pitch approaching the absolute. This, of course, was a by-product of the experiment, but an invaluable accomplishment for those children who wish to continue a musical education in a particular way.

The children who proved excellent in tone matching also proved excellent in rhythmic discrimination—with one exception, that of M. L. whose tonal reproduction did not come up to her rhythmic level. However, with additional training it was believed that M. L.'s tonal sense would have developed.

Formal lessons presented to the youngest of the group do not seem to be of great value, but at this time it is difficult to state just how much was gained from their pleasurable experience with pure tone.

It has been stated that these children were not an especially musical group, but all of them have gained in many respects. They have gained self-confidence in the use of their voices and in playing the gong. They have learned a certain amount of control and have formed good habits of

listening which should carry through to later years.

Recommendations. 1. That music be presented to the nursery school child in its most elemental form; namely, pure tone and fundamental rhythm patterns.

2. That the individual child's normal pitch be determined and used as a starting point.

3. That combinations of tone and rhythm be developed as the child's interest and capacity permit.

4. Accompanying this formal training in music, it is suggested that the child have the opportunity to hear good recordings. Quartet music is especially recommended as well as the selection of any good orchestra music providing the score is not too complex to be easily understood.

It is also suggested that the child be given the opportunity to see different instruments, to hear them individually and even to be allowed to experiment on them. Records, in fact all instrumental music will have more meaning from the appreciation standpoint alone if the child knows what a violin or cello is when he hears it, and how the music is made.

REFERENCES

- (1) COLEMAN, S. N.: Creative music for children. New York, Putman, 1922.
- (2) JOHNSON, H. M.: Children in the nursery school. New York, John Day, 1928.
- (3) JERSILD, A. T.: Training and growth in the development of children. New York, Bureau of Publications, Teachers' College, Columbia University, 1932, 68.
- (4) JERSILD, A. T., AND BIENSTOCK, S. F.: Influences of training on the vocal ability of three year old children. *Child Development*, 2, 272-291, 1931.
- (5) MURSELL, J. L., AND GLENN, M.: The psychology of school music teaching, New York, Silver, Burdett and Co., 1931, 36.
- (6) ROSSMAN, F. A.: Pre-school music, a guide to parents. New York, National Bureau for the Advancement of Music (no date).
- (7) SEASHORE, C. E.: The psychology of musical talent. Boston, Silver, Burdett and Co., 1919.
- (8) THORN, A. G.: Music for young children. New York, Scribner, 1929, 5.

Intelligence Scales for Preschool Children

WILLIE MAE C. MOWRER

THE problem of selecting a combination of tests such as intelligence and performance scales for which there are norms representative of the abilities to be expected at a given age is difficult when the children are under six years of age. To be satisfactory, a scale or series of tests should give data that are reliable for evaluation of the child's abilities in relation to other children of his age and for prediction of the future development of the child. Progress has been made in the development of tests for preschool children which purport to fill this requirement. The results obtained from the application of several forms of such scales to the same children, at intervals during their attendance at the Child Institute, has led the writer to expect wide variations with repetition of a particular form. Predictions of future development are based not only upon the objective data from tests but also upon the knowledge of the variations in response of children tested under similar conditions.

Individuals engaged in activities in which the use of such tests is desirable should recognize the variability in performance in interpretation of test scores. It is also important that those working toward methods of obtaining objective ratings valuable for prediction of future mental development

should not be content with applications and should study the factors that produce variability. The results from the use of several scales in the Child Institute of the Johns Hopkins University have been compared. During the fall term of each year the children are tested individually as a matter of routine. Among the tests which have been used are the Pintner-Patterson Performance Scale, the Merrill-Palmer Performance tests, The Stanford Revision of the Binet-Simon Scale and the Minnesota Preschool Scale. This paper reports the results from two revisions of the Binet-Simon Scale; the Minnesota Preschool and the Stanford Revision.

It is generally agreed that The Stanford Revision is not satisfactory for the preschool age. It has been found that the Intelligence Quotients obtained are apt to vary widely from test to test though given under as nearly similar conditions as possible. The Minnesota Scale attempts to meet these objections by increasing the number of items in the younger age ranges, by emphasizing performance skills, and by the use of a different system of evaluating the results obtained.

Records of 95 children for the Stanford Revision of the Binet-Simon Scale show a wide distribution of Intelligence Quotients for initial tests. This is

illustrated in figure 1. Retests show greater variability in Intelligence Quotients than are found for older children. A change of 5 points has been reported as the average change to be expected in retests. The Intelligence Quotients for the second test for 32 children are given in table 1.

The intervals between testing ranged from three to twenty-seven months. A few cases were tested at relatively short or long intervals, but the average interval was 12.68 months. For these intervals, we find the changes in Intelligence Quotients range from -3 to -24; from +5 to +29.

The variation between the intelligence quotients on the initial and retest for individual cases as brought out in table 1 are significant. Subject 6 and subject 25 at the time of the initial tests were handicapped by a lack of facility in verbal expression. This backwardness was the result of certain environmental conditions. With an opportunity for increased activity in certain types of expressive behavior subsequent retests show an upward trend in the intelligence quotient. Certain children are forced in language development. Such subjects are likely to show a decrease in I.Q. on tests subsequent to the original one providing that sufficient time is allowed to lapse between the tests. Subject 15, subject 20, and subject 22 are illustrative of early fluency and proficiency in the use of language. The immediate result of any test administered is influenced by the child's response to the artificial situation in which he finds himself. The timidity and shyness manifested by subject 31 when he was tested at 29 months led the examiner

to predict that this individual would make a better response when he improved in his adaptations to other children and to adults not of his family grouping. Acquaintance with the examiner and frequency of response in test situations appear to be influential upon initial tests, but adaptations in a larger group of children appear to be

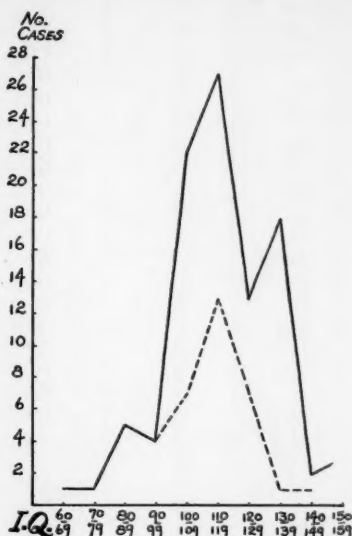


FIG. 1. THE DISTRIBUTION OF INTELLIGENCE QUOTIENTS FOR 95 CASES FOR STANFORD REVISION OF BINET SIMON AND 32 CASES FOR MINNESOTA PRESCHOOL SCALE

more influential upon the responses of the child under four years of age. Test scores suggest the future trend of the I.Q. in such cases but variations may be expected. Predictions of this nature are advanced cautiously by examiners whose knowledge of tests and of individual's reactions to tests render them capable of interpreting the available results.

TABLE 1

Individual changes in the intelligence quotients of 32 subjects as obtained on retests of the Stanford Revision of the Binet Simon scale in The Child Institute of the Johns Hopkins University

SUBJECTS	FIRST TEST		SECOND TEST		CHANGE IN I.Q.
	C.A.	I.Q.	C.A.	I.Q.	
1	<i>months</i> 27	116	<i>months</i> 51	121	+5
2	27	118	42	109	-9
3	29	131	44	150	+19
4	29	110	40	122	+12
5	30	100	45	120	+20
6	30	106	46	126	+20
7	30	116	41	122	+6
8	30	120	54	115	-5
9	31	135	44	132	-3
10	32	125	45	116	-9
11	33	121	42	114	-7
12	35	114	48	108	-6
13	37	129	51	113	+16
14	38	137	54	118	-19
15	40	135	51	113	-22
16	40	135	50	111	-24
17	40	130	49	142	+12
18	40	110	50	120	+10
19	40	70	43	88	+18
20	42	141	53	117	-24
21	42	124	59	115	-9
22	43	158	54	137	-21
23	46	152	58	147	-5
24	46	97	60	126	+29
25	48	104	64	113	+9
26	50	128	56	106	-22
27	51	130	64	137	+7
28	55	129	82	119	-10
29	55	100	63	111	+11
30	56	117	62	100	-17
31	56	112	62	133	+21
32	60	72	67	83	+11
Arithmetic Mean.....	40.25		52.93		13.69
Mean of minus changes.....					13.25
positive changes.....					14.13

The Minnesota Preschool Scale has been given to 32 subjects ranging in age from thirty-two to fifty-seven months. The distribution of the in-

telligence quotients obtained for this test are graphed in figure 1 together with those obtained for 95 cases of the Stanford Revision of the same

test. Among this group there were 12 children who had formerly been tested with the Stanford Revision.

The distribution according to chronological age of intelligence quotients from both scales is shown in figure 2. This indicates a close relationship between scores obtained on the two tests for the age range studied.

sion was given. The range of differences in Intelligence Quotients is from -5 to -27 points for the decreasing quotients; from +6 to +17 for the increasing quotients. The data given in tables 1 and 2 show that the mean changes in Intelligence Quotients from one test to a second in application of the Stanford Revision; and from

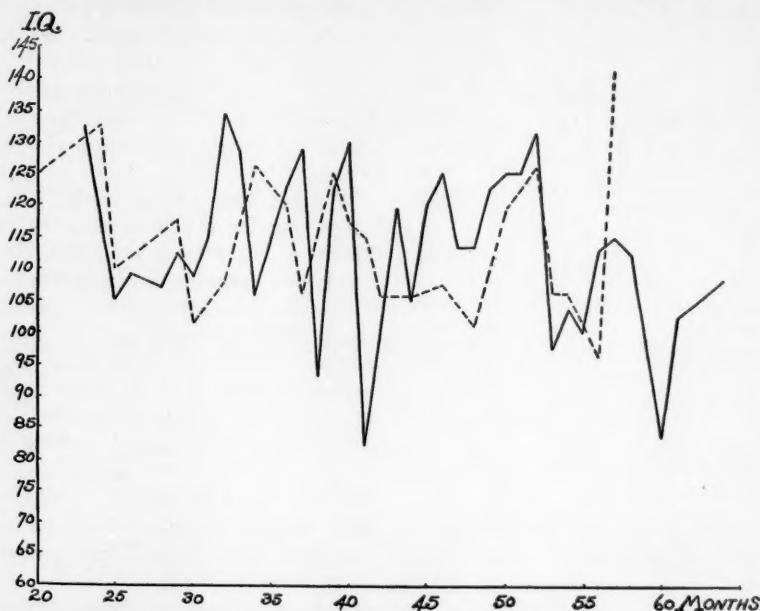


FIG. 2. DISTRIBUTION OF INTELLIGENCE QUOTIENTS FOR 127 CHILDREN ACCORDING TO CHRONOLOGICAL AGE

- - - Minnesota Preschool Scale: 32 children; — Stanford Revision: 95 children.

A comparison of the intelligence quotients for 12 children who were given both scales shows a range of differences similar to that found for retests with the Stanford Revision. The Minnesota Scale was given at intervals varying from six to twenty-four months after the Stanford Revision.

initial test with Stanford Revision to initial test with Minnesota Preschool Scale are approximately the same. The change from one scale to another is slightly less than from one test to a retest with the Stanford Revision. These data suggest that we may expect a change in Intelligence Quotient of 12

points on the average for retests of children under five years of age. It is also to be expected that the changes may be as often a decrease as an increase.

Though the group was small to

TABLE 2

SUBJECTS	STANFORD		MINNESOTA		DIFFERENCE IN I.Q.
	C.A.	I.Q.	C.A.	I.Q.	
1	24	108	32	99	-9
2	25	136	34	126	-10
3	30	126	38	140	+14
4	32	100	42	108	+8
5	37	143	43	116	-27
6	39	133	48	117	-16
7	45	120	52	126	+6
8	29	110	53	102	-8
9	47	89	54	106	+17
10	46	126	54	121	-5
11	46	102	56	92	-10
12	49	127	57	141	+14
Mean of differences.....					12

Twelve subjects were given the Stanford Revision of the Binet-Simon and later retested by means of The Minnesota revision. This table gives the individual scores obtained for each subject.

which The Minnesota Preschool Scale was given the discrepancy in classification of a child on the basis of an Intelligence Quotient is important. If we use the same term, Intelligence

Quotient, as a score for two scales and within an interval of six or eighteen months find the child placed in a different grouping by the other scale, there is need of consideration of variations with age and with other factors not included in test administration that may influence these changes. Repetition of the scales that have been developed for the purpose of classification of preschool children should give data for analysis of these influential factors. No rigid classification of the intelligence of the child appears to be justified from the application of the scales.

The importance of additional data concerning the child's developmental history and his behavior during the test is given consideration in the record blanks for The Minnesota Preschool Scale. The interpretation of these additional data depends upon the experience and personal equation of the examiner. In the application of such scales to preschool children it is of special importance that the examiner should be experienced in interpretation of child behavior. Behavior in test situations can not be interpreted for reliable predictions of future development unless the examiner has learned to interpret the behavior of the child in other situations.

A Study of the Relation between Self-Assurance and Skill in Young Children

ARDITH L. EMMONS¹

THE purpose of this study is to investigate the relationship between self-assurance and skill in young children. In an unpublished study of the influence of attitudes upon the social relations of the classroom the writer observed wide variation in the overt responses of children to certain attitudes on the part of their teachers. This preliminary study suggested the possibility of further investigation in order to determine whether or not there exist, within the personality of the child, factors which tend to make him react to a given situation in a characteristic manner. Subsequent observation of pre-school children revealed a similar range of individual differences in the manner of response to various situations encountered, and gave impetus to further investigation.

The trait of self-assurance was selected for this particular investigation because of its significance in the social adjustment of the individual and because it appeared to offer possibilities for quantitative treatment through measurement of overt responses to certain controlled situations.

The specific problems involved in the investigation are:

1. To what extent is self-assurance a correlative of skill in young children?
2. Is the degree of self-assurance relatively constant in a given child, throughout a series of controlled situations; that is, does the child behave in a manner fundamentally characteristic of him?
3. Do self-assurance and skill increase with chronological age?
4. Does the degree of self-assurance vary directly with intelligence?

In the present study, 16 nursery school children were observed in a series of controlled situations. Records were kept of each child's response to the situations and in each case ratings representing the subject's skill and self-assurance were obtained.

It must of course be borne in mind that neither the number of subjects nor the number and variety of situations employed are sufficient to warrant generalization. Therefore, any conclusions drawn from this study must necessarily be tentative and limited to the subjects and situations which fall within its scope.

DEFINITION OF TERMS

The particular trait of self-assurance is here defined as the characteristic tendency of an individual to act deci-

¹ A report of a study presented in partial fulfillment of the requirements for degree of Master of Arts, Department of Child Development, Mills College.

sively, with confidence in his own power and ability.

A survey of previous studies leads to a tentative acceptance of the concept of traits, not as inherited, independent entities, but as loosely organized tendencies to behave in characteristic ways, developed gradually in response to environment and capable of being modified by training and experience.

The concept of traits here presented has particular significance for parents and teachers of young children. While recognizing the presence, at birth, of certain factors which favor the development of one set of traits rather than another, those who accept this view see the child's experience as the important factor in shaping his personality. Recognition of this concept carries with it a sense of responsibility for providing an environment which is conducive to the fullest possible development of the personality of the child, within the limits set by his heredity.

SUBJECTS

The subjects in this study were sixteen children enrolled in the Mills College Nursery School. Of this group ten were boys and six were girls. They ranged in chronological age from twenty-three months to fifty-six months. Their intelligence quotients, as determined by the California Pre-School Schedule I, ranged from 99 to 160.

SELECTION OF TESTS

An attempt was made to include in the series some tests which would be capable of solution by the youngest

subject as well as some which would be difficult for the older subjects in the group. A list of the tests employed in the controlled situations of this investigation appears in table 1.

Of the tests selected, only one, the Sixteen Cubes, was successfully performed by each of the 16 subjects, while Test 7, the Mare and Foal picture, was completed by 5 subjects. Only 4 of the children succeeded in completing the entire series of tests.

EXPERIMENTAL TECHNIQUE

The data upon which the present study is based were secured during the

TABLE 1
Tests employed

NUMBER	NAME OF TEST
1	Nest of Four Cubes (Stutsman)
2	Nest of Cubes, with assistance offered
3	Nest of Seven Cubes
4	Sixteen Cubes
5	Straight Tower
6	Three-button Jacket
7	Mare and Foal

regular sessions at the Mills College Nursery School, throughout the four months from January to April inclusive. The testing periods were confined to the hours between nine and eleven in the morning and in no case exceeded fifteen minutes in length.

The children were taken in turn, from the playground or playroom, with the promise of a new game. With few exceptions they accepted the invitation readily and they frequently approached the examiner with voluntary requests for another game.

Upon entering the room the child

was seated at a low table suited to his height, and the materials of the test were presented according to prescribed regulations. In Situation 6 the subject was not seated, but remained standing beside the table since this position insured the greatest degree of freedom for the manipulation of the buttons and buttonholes.

Having presented the materials and given necessary instructions the examiner turned to the task of recording as fully as possible the child's response to the situation. Notes were made concerning his attitude and comments, method of attack upon the problem, and other significant facts observed in his performance.

Care was taken to avoid any appearance of coercion. If a child refused the invitation to go to the testing room, he was urged mildly, but if he persisted in his refusal he was allowed to wait until a later period. Similarly, if a child refused to complete a test which he had begun, or if he insisted upon abandoning the task and returning to the playground before the close of the testing period, he was not forced to continue.

Except in case of absence or refusal to coöperate in the test, the order in which the children were tested was kept constant and one series of tests was completed before another was begun. This insured some uniformity of procedure in spite of unavoidable variation in the length of the interval elapsing between tests.

METHODS OF SCORING

Scores were obtained in terms of self-assurance, time, and amount of success. Self-assurance is defined in

this study as the characteristic tendency of an individual to act decisively, with confidence in his own power and ability. Because of the complexity of the trait as a whole, it was decided to base its measurement not upon a single scale for self-assurance, but upon a number of definitely specified types of response or manifestations of self-assurance. For this purpose, thirteen specific types of response were selected from the observational notes as possible criteria of self-assurance. These were presented to five members of the nursery school staff who were requested to check those items which they believed to be of value in determining the degree of self-assurance present in an individual.

The 7 types of response which were checked by three or more persons were then arranged in a five point rating scale, by means of which individual ratings in the trait were determined. Ratings upon this scale designated degrees of self-assurance as follows:

Markedly above average.....	5
Slightly above average.....	4
Average.....	3
Slightly below average.....	2
Markedly below average.....	1

A copy of this scale is shown on page 326.

Obviously the types of response thus selected as criteria of self-assurance cannot be attributed to the presence of this trait alone, but they do appear to be direct indicators of the presence of the trait as here defined. It is of course recognized that these 7 types represent only a few of the many ways in which self-assurance may be expressed. They were selected for use in

this study because of the frequency with which they appeared in the controlled situations.

The method of deriving scores for self-assurance was as follows: A form was prepared upon which the frequency of the various types of response could be tabulated for each situation. Items recorded in the observational notes were examined in turn and those falling within the scope of one of the seven types of response selected as criteria of self-assurance were recorded by means of plus and minus symbols.

five on that section of the scale while any sum of one or less entitled him to a rating of one. Thus the numerical ratings in self-assurance might range from seven to thirty-five; actually they ranged from twelve to thirty-one.

The number of seconds required for successful completion of the task was taken as the score in skill in 7 of the experimental situations, namely, the nest of four cubes, the nest of four cubes with assistance offered, the nest of seven cubes, the sixteen cubes, the three-button jacket, and the Mare and

RATING SCALE FOR SELF-ASSURANCE

Name.....

	5	4	3	2	1	
Entered into test readily						Refused to enter into test
Showed eagerness to begin task immediately						Delayed beginning task
Expressed confidence in his ability to accomplish it						Expressed lack of confidence
Worked without asking aid or approval						Frequently sought aid or approval
Refused aid offered						Accepted aid offered
Expressed enjoyment in task						Cried or otherwise expressed displeasure
Asked for additional materials						Continued aimless manipulation of materials at hand

A single symbol (plus or minus) was used to represent a moderate manifestation of the trait, double symbols (++) or --) represented extreme manifestations, while 0 was used to indicate absence of data concerning the trait in a particular case. The algebraic sum of the symbols tabulated was then determined and translated into the final rating in self-assurance.

Ratings for each type of response ranged only from one to five. Therefore, any sum of five or more in a given type entitled the subject to a rating of

Foal. In Situation 5, the number of blocks successfully placed in the straight tower, was used as the score.

Numerical scores in self-assurance and skill having been secured, they were arranged in rank order and correlations were determined by means of the Spearman rank difference method, using the formula

$$P = 1 - \frac{6\sum d^2}{N(N^2 - 1)},$$

with equivalent r inferred.

DETERMINATION OF VALIDITY AND
RELIABILITY

An attempt was made to determine the validity of the rating scale as a measure of self-assurance, by means of correlations with teachers' estimates. Five members of the nursery school staff ranked the 16 subjects in order of their degree of self-assurance. The median of these rankings was then correlated with the ranking in self-assurance as determined by the rating scale devised in this experiment. The two rankings were found to correlate $+0.81 \pm 0.05$.

In order to obtain an indication of the reliability of this experiment the ratings for self-assurance obtained in certain of the controlled situations were correlated with those obtained in other situations. The correlations ranged from $+0.52 \pm 0.05$ to $+0.76 \pm 0.07$. As a further check upon reliability, 5 members of the nursery school staff rated each subject in self-assurance upon the basis of the data recorded for Situation 1. The median ratings thus obtained were then correlated with the ratings for self-assurance in Situation 1 as determined by the scale devised in this experiment. A correlation of $+0.96 \pm 0.013$ was obtained.

RESULTS

The data obtained in this investigation have been studied in terms of the relation of self-assurance to chronological age, intelligence quotient and skill in the various situations. The final results may be summarized as follows:

1. A low but positive correlation is found to exist between self-assurance and skill as measured in this experi-

ment. The correlations between the two traits range from $+0.20 \pm 0.11$ to $+0.82 \pm 0.07$ in the various situations employed.

2. Ratings for self-assurance correlate $+0.81 \pm 0.05$ with teachers' estimates of the trait in the several subjects.

3. A positive relation is also apparent when ratings for self-assurance obtained in the various experimental situations are correlated with each other.

4. Chronological age and self-assurance bear a positive relation to each other; the correlations range from $+0.36 \pm 0.13$ to $+0.83 \pm 0.05$.

5. Correlations ranging from -0.10 ± 0.20 to $+0.74 \pm 0.08$ indicate that a positive relation also exists between chronological age and skill in the subjects examined.

6. Intelligence is found to correlate positively with self-assurance ratings in each of the experimental situations.

CONSISTENCY OF THE TRAIT OF SELF-
ASSURANCE

The subjects were found to exhibit a fairly consistent degree of self-assurance in the various controlled situations of this investigation and in the activities of the nursery school. The tendency of individuals to react to situations with a characteristic degree of self-assurance is indicated by the positive correlations which were found to exist between the ratings for self-assurance obtained in the different situations employed in this study. This tendency is further indicated by the fact that the total rankings for self-assurance obtained by means of the rating scale, correlate $+0.81 \pm 0.05$

with teachers' rankings for the trait, based upon their observations of and acquaintance with the children throughout the year.

Although exceptions to the characteristic mode of behavior occurred with sufficient frequency to make absolute rankings impossible, yet the consistency was marked enough to lend support to the theory of a personality trait as a loosely organized tendency of an individual to behave in a manner fundamentally characteristic.

In addition to quantitative results this investigation has yielded qualitative data concerning the consistency of such personality traits as interest in detail, self-criticism and mode of reaction to difficulties encountered. Examination of observational notes leads to the conclusion that the expressions of these traits recorded during the experimental situations are typical of the general behavior of the several subjects. In

so far as this is true they lend support to the concept of a personality trait as the tendency to react in a characteristic manner.

Because of the small number of subjects used in this investigation, generalization is obviously impossible. However, an analysis of the results seems to justify the following tentative conclusions:

1. Self-assurance and skill tend to occur together in the subjects in this study.
2. The results of the investigation confirm the initial assumption that the degree of self-assurance is relatively constant, although not uniform, in a given child, throughout the series of controlled situations and in the general activities of the nursery school.
3. Both self-assurance and skill increase with chronological age.
4. The trait of self-assurance tends to vary directly with intelligence.

The Effect of Nursery School Training upon the Later Food Habits of the Child

ELISE HATT CAMPBELL

PROFESSIONAL interest in the preschool child, so marked in this country since 1920, has been based partly upon the belief that habits and attitudes formed during early childhood are far more important than those formed during school years in determining later behavior patterns. Nursery schools have emphasized the importance of this early training. In discussing the place of the nursery school in the education of the child, Dr. Edna N. White (6) writes: "... the nursery school regime is planned to enable him to develop good habits of body and mind which will be of service to him all his life." American nursery schools have now been in operation long enough to permit some analysis of their success in this direction.

The consistent training given children at the better nursery schools facilitates a measurement of results, whereas such a measurement of home training would be practically impossible because of the differing and often inconsistent methods followed. So far, however, there have been few studies which attempt to measure the results of nursery school training. Taylor and Frank (3) report a method of tracing the appearance and disappearance of behavior and personality problems which they used in a follow-up of

30 former nursery school children. They interviewed the mother and teacher and noted for each problem whether it had been present during the nursery school period, whether the child had shown improvement during that time, and whether the mother or teacher had observed the problem to be present in later years. Though they offer a tentative summary of their data, the authors draw no conclusions as to their value. They mention the inadequacy of the reports made by most public school teachers, the difficulty of obtaining objective judgments from others, and the necessity of supplementing such follow-up information with a trained worker's observations of the child in the home.

For four years the Merrill-Palmer School has carried on a follow-up program with 100 of its nursery school graduates. This program, comprising recreational clubs meeting weekly during the school year and a summer camp with a season of six weeks, is described in some recent publications (1, 4). The clubs, with a membership of about one hundred, are made up almost entirely of children who have attended the Merrill-Palmer nursery school. Some of them have been out of the nursery school for ten years, others for only a few weeks. The enrollment of the

camp is only about one-third that of the clubs. A fee covering the cost of maintenance is charged, and this prevents some of the eligible nursery school graduates from attending.

During the season of 1931 it happened that the camp enrollment was about equally divided between children who

approximately alike in age, sex, intelligence, and socio-economic status.

FOOD HABITS SELECTED FOR STUDY

In selecting a habit to be observed in the two groups, a number of criteria were kept in mind, i.e., that training in this habit should have been em-

TABLE 1
Nursery school attendance of 18 children attending camp

CODE LETTER	NURSERY SCHOOL ATTENDANCE			
	Semesters of attendance	Date of entrance	Date of withdrawal	Time since attendance
				<i>years</i>
A	7	2- 9-25	6 -28	3
B	6½	3- 7-27	6- 6-30	1
C	6	1- 3-23	2- 2-26	5½
D	6	2- 2-25	1-27-28	3½
E	5½	9-14-25	3-27-28	3½
F	5	2-14-28	6- 6-30	1
G	4	1- 4-27	1-25-29	2½
H	4	1- 3-27	1-25-29	2½
I	4	2-10-25	1-28-27	4½
J	3½	9-29-24	4- 2-26	5½
K	3	2- 4-25	6-16-26	5
L	3	9-10-28	1 -30	1½
M	3	1-13-22	6-15-23	8
N	2½	2-23-25	4-29-26	5½
O	2	9 -26	6 -27	4
P	1½	11- 6-22	5 -22	9
Q	½	1-10-22	3-30-22	9½
R	½	1- 9-22	3-21-22	9½
Mean	3.75			4.63

had attended the nursery school and children who had not. It occurred to the staff that the camp season presented an opportunity to observe for six weeks, twenty-four hours a day, the difference between a group of former nursery school children and a group of children who had never attended a nursery school, should they prove to be

phasized throughout the history of the nursery school, that the habit should be sufficiently easy for the camp counsellors to observe and measure, and that it should be one concerning which the parents had been given a maximum amount of instruction during the child's nursery school life.

Eating was selected as a habit that

met these requirements. There have since been some changes in the discipline at nursery school meals, and the menus during the school years from 1921 to 1925 were more bland and less varied than thereafter, when 14 of the 18 children included in the study attended (table 1), but the training during the entire period was much the same and was under the supervision of the same nursery school teacher. All children were expected to finish the food placed before them, the amount being adjusted to age and appetite, and delay devices were not permitted. The parents had been given a good

trained at the Merrill-Palmer School, and menus served at the Detroit and Ann Arbor nursery schools were planned by the same person. These 18 children attended nursery school for periods varying from half a semester to seven semesters, half of them for four or more semesters (table 1).

Some children had been away from the nursery school for nine years, some for only one year. Eight children, or 44.4 per cent, had attended the nursery school within the three years preceding the camp season (table 1). Since the oldest child who had attended nursery school was 13 years, 5 months

TABLE 2

Comparison of the sex composition and mean age, mental age, I.Q., and socio-economic status of the two groups

GROUP	NUMBER OF CASES	BOYS		GIRLS		AGE		MENTAL AGE (MEAN)	I.Q. (MEAN)	SIMS SOCIO-ECONOMIC STATUS (MEAN)
		N	Per cent	N	Per cent	Mean	S.D.			
Experimental.....	18	11	61.11	7	38.89	9-5	2.35	11-7.8	125.72	29.36
Control.....	15	8	53.33	7	46.67	9-3.6	2.36	11-6.5	125.07	29.89

deal of instruction about the children's food. Further, the children's food habits were easily observed at the camp.

Selection of cases

In the season of 1931, 33 children were enrolled in the Merrill-Palmer Camp. Of the 18 who had attended nursery school, 16 had been in the Merrill-Palmer nursery school, 1 in the Merrill-Palmer nursery school at Ann Arbor, and 1 in the Highland Park nursery school. The educational policies of all three schools were much the same. The teachers were usually

old, and the youngest 6 years old, the study deals with the effect of nursery school training over a fairly long period of the child's life.

The experimental and control groups, i.e., the camp children who had attended nursery school and those who had not, proved to be fairly well matched in chronological age, mental age, IQ, and socio-economic status. The experimental group (called hereafter the "E group") had slightly more boys than did the control group (called hereafter the "C group"), which might be expected to give them an initial advantage in such a study. The

chronological age was slightly higher and the mental age and IQ slightly superior in the E group; the C group had a slight advantage in socio-economic status (table 2).

So far as we knew, the children sent to camp primarily because they were food problems were no more numerous in the control group than in the experimental group. A staff member suggests that the E group is not represent-

mother said was an excellent eater at home proved difficult to feed at school. However, an examination of the records of the later entrants shows that an equal proportion (3 of 6) were difficult to feed at home before they entered the nursery school, or at the nursery school, or both. At the camp their food habits as a group were not superior to those of the earlier entrants (table 3, column 4).

TABLE 3

Early feeding history and rank on food scale at camp of 12 children who entered nursery school when feeding difficulties were sometimes the basis of admission

CODE LETTER	DATE OF ENTRANCE TO NURSERY SCHOOL	FEEDING HISTORY BEFORE ENTRANCE TO NURSERY SCHOOL	RANK ON FOOD SCALE*
Q	1-1922	Difficult†	9
R	1-1922	Excellent	1
M	1-1922	Excellent	6
P	11-1922	Diet not varied	13
C	1-1923	Dawdling, not difficult	5
J	9-1924	Overeats	11
A	2-1925	Excellent	10
N	2-1925	Difficult†	18
I	2-1925	Difficult†	14
K	2-1925	Difficult†	17
D	2-1925	Difficult	7
E	9-1925	Good	12

* Among 18 former nursery school children attending camp.

† Child was sent to nursery school primarily because the parents needed help with feeding difficulties.

ative of Merrill-Palmer children, since 12 out of 18 of them attended at a time when children were occasionally selected for admission because they needed retraining in food habits. Since 1926 children have been admitted on a basis (2) which offers little more than a chance possibility of their having faulty habits at entrance. The records of these 12 children show that the parents of 4 of them admitted that it was difficult to feed them at home, and that another child whom the

Method of observation and analysis.
The 33 children were observed by counsellors at meal-time, three times a day, for a six-week period. Each table accommodated five children and one adult, though there were fewer than five children at certain tables. Counsellors remained at the same table for the entire period, but the children changed places every Sunday, so that each child had a week's experience with six different counsellors and with six different groups of children. This

TABLE 4
Food Habits Rating Scale
(Original list)

SCALE VALUE	TIMES CHECKED†	KEY NUMBER	STATEMENT
	71	1	*Always asks for second helpings
	42	2	*Eats more than two helpings of meal
		3	Always eats two dinners
		4	Always eats two desserts
	81	5	*Always eats second helpings of bread or sandwiches
	7	6	*Never has second helping of main course
	119	7	*Occasionally has second helping of main course
		8	Never has second dessert
		9	Occasionally has second dessert
		10	Occasionally has second sandwich
	10	11	*Never has second helping of bread or sandwiches
0.05	15	12	*Never finishes all his meal
	53	13	*Occasionally leaves some of meal
2.35	7	14	*Refuses to finish meal when urged
10.97	137	15	*Enjoys his food
0.60	22	16	*Always indifferent to eating
2.50	62	17	*Refuses to eat specific foods
		18	Eats specific foods when urged
	87	19	Eats better when sitting near an adult in authority
	15	20	*Eats better when sitting next to good eater
3.57	9	21	*Eats less when sitting near poor eater
11.00	74	22	*Eats well even if no adult is near
		23	Attitude toward meal not affected by example of good eater
		24	Attitude toward meal not affected by example of poor eater
2.45	46	25	*Complains about preparation of food
		26	Likes to salt food
1.85	16	27	*Uses salt and pepper freely
		28	Never seasons foods at table
		29	Impatient to be served and begin meal
		30	Criticizes other children's attitude
0.20	4	31	*Absolutely refuses to try new foods
		32	Will eat foods he dislikes if he has helped to cook them
	7	33	*Eats vegetables in soup or stew which he refuses to eat alone
	0	34	*Refuses plain milk but drinks it when flavored with cocoa, etc.
	0	35	*Refuses to drink milk but will eat it combined with other foods
		36	Drinks milk under protest
1.10	29	37	*Inordinately fond of sweets
		38	Comments on desserts not being sweet enough
	3	39	*Dislikes sweet foods
	56	40	*Asks for sugar to put on fruit
		41	Comments on desserts being too sweet

TABLE 4—Continued

SCALE VALUE	TIMES CHECKED†	KEY NUMBER	STATEMENT
0.70	10	42	*Refuses to eat eggs in any form
	34	43	*Will eat eggs cooked in some ways
	2	44	*Eats eggs only if disguised
10.85	137	45	*Eats eggs served in any way
1.40	1	46	*Absolutely refuses to eat creamed foods
	8	47	*Eats creamed foods under protest
	28	48	*Prefers buttered to creamed vegetables
		49	Eats all kinds of meat with zest
	3	50	*Eats meat only when urged
2.50	0	51	*Refuses to eat most meats
		52	Always eats meat and potato first
1.90	13	53	*Will eat tubers but not leafy vegetables
3.90	5	54	*Will eat vegetables when served separately but not when combined
3.80	12	55	*Will eat some vegetables when combined with another but not alone
		56	Eats leafy vegetables occasionally
		57	Expresses dislike for all root vegetables except potatoes
10.80	93	58	*Eats all raw vegetables with relish
0.20	7	59	*Refuses all raw vegetables, alone or combined
		60	Refuses all raw vegetables except lettuce
		61	Refuses all raw vegetables except celery
		62	Refuses combinations of raw vegetables in salads
		63	Prefers bland foods
		64	Dislikes strongly flavored foods
11.00	138	65	*Fond of all fruits
	7	66	*Refuses to eat dried fruits
		67	Will eat dried fruits when urged
		68	Prefers dried to fresh fruits
2.00	9	69	*Likes very few fruits
9.40	9	70	*Rather eat fruits than sweet dessert
	58	71	*Eats all foods without urging, whether likes them or not
	73	72	*Eats most foods without urging, whether likes them or not
		73	Has to be urged many times to eat foods disagreeable to him
0.60	45	74	*Has a great many food prejudices
		75	Has only one or two food prejudices
10.90	63	76	*Has no food prejudices
0.04	41	77	*Bolts food, hardly masticates at all
		78	Washes food down with milk or water
		79	Chews food ordinary length of time
		80	Chews food inordinate length of time
	12	81	*Suffers intense emotion on being made to eat disagreeable foods. Would prefer to do without dessert, or any other pleasant thing than eat foods disagreeable to him
	19	82	*Inclined to drink a great deal of milk, and then unable to finish dinner
1.70	29	83	*Inclined to eat great quantities of bread or rolls at expense of rest of dinner

TABLE 4—*Concluded*

SCALE VALUE	TIMES CHECKED†	KEY NUMBER	STATEMENT
11.00	35	84	*Relishes leafy vegetables
10.00	69	85	*Eats leafy vegetables, not commenting on likes or dislikes
1.30	12	86	*Has great distaste for leafy vegetables
1.75	23	87	*Very particular about disliked food, e.g., scrapes every bit of mayonnaise from lettuce leaf before he will eat lettuce
		88	Eats small helpings of everything
		89	Eats large helpings of everything
		90	Eats seconds, thirds, and fourths of desserts
		91	Eats all that is put on his plate, but is not inclined to ask for more
	51	92	*Talks a great deal at meals, hence gets behind the others
		93	Plays with other children at meals, hence gets behind the others
		94	Uses no delay devices, but eats very slowly
		95	Finishes meal with dispatch; always among the first through
		96	Inclined to balk at a new kind of food
10.20	37	97	*Likes to try new foods
10.90	138	98	*Leaves clean plate
	48	99	*Leaves plate clean only when urged a great deal
		100	Leaves plate clean with slight urging

* Statement retained in first revision.

† By all counsellors for all children during camp season.

seating plan made it possible to give all children in the study equal advantages in sitting with different counsellors and companions, and gave them all an even chance, whether favorable or unfavorable, in sitting with certain counsellors more skillful than others in handling children who find it difficult to eat their meals or with children who by bad example disturb the normally good eating habits of others.

The food habits of the two groups of children were observed and measured on the basis of a rating scale, the time spent in eating meals, and the amount of food eaten. Some consideration was also given to food habits in relation to age, physical condition, the food habits of siblings, and the recency and duration of nursery school training.

Comparison of the food habits of the two groups as measured by a rating scale.

Before the camp opened a series of 100 statements describing the good and bad food habits of children was submitted to 58 staff members and students of the Merrill-Palmer School. They were asked to indicate where they thought each statement should be placed on a scale of 11, the highest number to indicate the most desirable kind of food habit, the lowest the least desirable. These 58 judgments were used to scale the statements by Thurstone's method of equal-appearing intervals (5). The series was called the Food Habits Rating Scale.

In the process of scaling, all but 33 of the original 100 statements were eliminated as irrelevant or ambiguous.

In the original list (table 4), the statements used by the counsellors in rating after the scaling was completed (second revision) are given. In the first

TABLE 5
Food Habits Rating Scale
(Final revision)

SCALE VALUE	KEY NUMBER	STATEMENT*
0.04	77	Bolts food; hardly masticates at all
0.05	12	Never finishes all his meal
0.20	31	Absolutely refuses to try new foods
0.20	59	Refuses all raw vegetables, alone or combined
0.60	16	Always indifferent to eating
0.60	74	Has a great many food prejudices
0.70	42	Refuses to eat eggs in any form
1.10	37	Inordinately fond of sweets
1.30	86	Has great distaste for leafy vegetables
1.40	46	Absolutely refuses to eat creamed foods
1.70	83	Inclined to eat great quantities of bread at expense of rest of dinner
1.75	87	Very particular about disliked foods; e.g., scrapes all mayonnaise from lettuce before he will eat it
1.85	27	Uses salt and pepper freely
1.90	53	Will eat tubers but not leafy vegetables
2.00	69	Likes very few fruits
2.35	14	Refuses to finish meal when urged
2.45	25	Complains about preparation of food
2.50	51	Refuses to eat most meats
2.50	17	Refuses to eat specific foods
3.57	21	Eats less when sitting near poor eater
3.80	55	Will eat some vegetables when combined with another but not alone
3.90	54	Will eat vegetables when served separately but not when combined
9.40	70	Would rather eat fruits than sweet desserts
10.00	85	Eats leafy vegetables, not commenting on likes or dislikes
10.20	97	Likes to try new foods
10.80	58	Eats all raw vegetables with relish
10.85	45	Eats eggs served in any way
10.90	98	Leaves clean plate
10.90	76	Has no food prejudices
10.97	15	Enjoys his food
11.00	22	Eats well even if no adult is near
11.00	65	Fond of all fruits
11.00	84	Relishes leafy vegetables

* Arranged from least desirable to most desirable.

the camp children are marked with an asterisk (first revision). The scale values of the 33 statements remaining revision, statements were rejected when inspection showed the distribution of judgments on them to conflict

grossly with either of the two criteria of relevance and lack of ambiguity. In the second revision the list was further reduced to 33 statements on the basis of a study of the percentile curves.

The number of statements remaining under each scale unit after the final revision was as follows:

SCALE UNIT	NUMBER OF STATEMENTS
0.0- 0.4	4
0.5- 1.4	6
1.5- 2.4	7
2.5- 3.4	2
3.5- 4.4	3
4.5- 5.4	0
5.5- 6.4	0
6.5- 7.4	0
7.5- 8.4	0
8.5- 9.4	1
9.5-10.4	2
10.5-11.4	8

The elimination of two-thirds of the original statements resulted in a scale lacking in items describing moderately desirable eating habits. It seemed easier for the judges to agree on extreme faults and virtues than on moderate ones. It is also probable that there were not enough moderate statements in the original list of 100. The scale is also overweighted with items describing faults. In revising the scale it will be desirable to substitute the word "often" for "always" in some items, to include some additional statements suggested by counsellors, and to balance the items describing good and bad habits. However, though the scale in its present form leaves much to be desired, it does allow comparison of the two groups of children in food habits not shown by the other two measures used.

To measure the desirability of a child's eating habits, an observer checks the applicable items on the scale after he has spent a week, comprising 21 meals, with the child. The score is the mean of the scale values of the checked items.

In comparing the 2 groups of children, the mean of the checked items in all ratings was used as the score of each child. The results (table 6) show only a slight advantage in favor of the nursery school graduates, and this difference is not reliable.

It may appear that the camp regime would have a levelling effect upon the children and that a rating taken in the first week of the camp season would therefore reveal the original differences between the two groups better than a rating representing the whole season. Actual data show, however, that the mean difference between the two groups was less the first week (0.121) than for the six weeks as a whole (0.28). Further, the single rating from one counsellor which is all that is available at the end of the first week is likely to be less reliable than the several ratings on each child available at the end of the season. It also appears from close observation that the camp regime did not tend to equalize the children. It did improve the habits of most of them, but since it was beneficial to those who had superior food habits when they came as well as to those who came with less desirable ones, their relative ranks seemed to remain about the same.

Observations made on the basis of the rating scale show some interesting facts about the children's eating habits, irrespective of the group to which they

TABLE 6

Comparison of the E and C groups as rated by the Food Habits Rating Scale

GROUP	MEAN SCORE	STANDARD DEVIATION	STANDARD ERROR	STANDARD DEVIATION OF THE DIFFER- ENCE	DIFFERENCE STANDARD DEVIATION OF THE DIFFERENCE	CHANCES
Experimental.....	7.94	2.2263	0.5247			
Control.....	7.56	2.3358	0.6031	0.7931	0.4791	$\frac{6.9}{106}$

TABLE 7

Comparison of the E and C groups in first and last halves of camp season, as rated by Food Habits Rating Scale

GROUP	AVERAGE SCORE		RANK DIFFER- ENCE, FIRST HALF AND LAST HALF, $\rho =$	PROBABLE ERROR
	First half	Last half		
Experimental.....	7.66	8.36	0.746	0.07
Control.....	7.63	7.75	0.658	0.10
Both.....	7.65	8.08		

TABLE 8

Items of Food Habits Rating Scale checked 50 times or more, listed in order of frequency of checking

KEY NUMBER	TIMES CHECKED*	STATEMENT
98	138	Leaves clean plate
65	138	Fond of all fruits
45	137	Eats eggs served in anyway
15	137	Enjoys his food
7	119	Occasionally has second helpings of main course
58	93	Eats all raw vegetables with relish
19	87	Eats better when sitting near an adult in authority
5	81	Always eats second helpings of bread
22	74	Eats well even if no adult is near
72	73	Eats most foods without urging, whether likes them or not
1	71	Always asks for second helpings
85	69	Eats leafy vegetables, not commenting on likes or dislikes
76	63	Has no food prejudices
17	62	Refuses to eat specific foods
71	58	Eats all foods without urging, whether likes them or not
40	56	Asks for sugar to put on fruit
13	53	Occasionally leaves some of meal
92	51	Talks a great deal at meals, hence gets behind others

* By all counsellors for all children during camp season.

belong. Thus, of 18 items of the scale checked more than 50 times (table 8), the greatest number of checks go to items describing desirable habits, in spite of the fact that the scale contains twice as many items describing faults. The only unfavorable item near the top of the list is 19, "Eats better when sitting near an adult in authority," and this one does not describe a serious fault. Is it possible that the consistently good behavior of many of the children is to be explained by the consistently good discipline at the camp?

Comments made by the counsellors during the last two weeks of the camp season show that specific dislikes for a few or many foods were very much more common than any general anorexia. A few of the comments were:

Didn't want to eat tomato. Looked around room.

Would not finish corn bread.

Did not like cereal and also asked for a small serving of egg.

Does not like butter on some things. Doesn't dislike it as much as his brother does.

At first refused egg, but ate it when told he had to.

Dislikes egg.

Has to be reminded to eat. Looks around too much. (This child was the only one who had no particular dislikes, but always found it difficult to finish a meal.)

Complained about apricots. Urged five times.

Refused to eat fresh vegetable salad.

Complained about apricots. Fifteen minutes on them alone.

Said she could not eat beans.

Comparison of the food habits of the two groups as measured by the amount of time spent in eating meals. The amount of time taken to eat meals was another method used in measuring the food

habits of the two groups. Though such a factor may at first appear irrelevant, it is in fact a fairly satisfactory measure of good or bad food habits, for there seems to be a positive correlation between a liking for food and the speed of eating. Children who dislike certain foods or prefer not to finish their meal almost always delay and take longer to eat than do children of good food habits. For all but 3 of the 33 children at the camp, the measure proved to be a satisfactory one. Of these three, one was a boy who would finish his meals without adult urging but ate slowly. The other two were children who, though they ate fast, had many food dislikes. One of these belonged to the group of six adolescents at the camp, all of whom ate rapidly.

In this connection the dining regime of the camp should be described. The large meal of the day was served at noon. Two children from each table acted as waiters. Cereals, vegetables, meat, and eggs were served to each child from a dish placed before the counsellor sitting at the table with the children. Desserts, fruit at breakfast, and salads were served from the kitchen in portions roughly suited to the age of the children for whom they were intended. The child was allowed to say how many spoonfuls of a food he wanted, but he was expected to finish what he asked for. Foods served from the kitchen were to be finished. Children could have second helpings or more of most dishes.

During the fifth and sixth weeks of the camp season the counsellors were asked to fill out observation blanks at each meal, noting the time necessary

for each child to finish the meal, the amount eaten, and remarks. Later, it was found that the records of only five days of this period could be used, since certain of the children had been absent on hikes and other entertainments on the other days. The records for 2 days of the fifth week and 3 days of the sixth were used in the study. On these days all the children were present for all meals. Time was measured in minutes, beginning when the first mouthful was taken and ending when the last was swallowed.

one than the other. Distribution curves of time for the two groups for each of the three meals showed that children who took more than 31 minutes to finish the meal were comparatively rare at any meal or in either group. At breakfast, the percentage of the E group who did so was 5.56, of the C group, 9.46; at lunch, 12.36 of the E group and 8.22 of the C group; at supper, 5.75 of the E group and 0.00 of the C group. In some cases, children took as long as 43 minutes to finish a meal. Thus, the advantage in

TABLE 9

Comparison of the E and C groups in the amount of time (minutes) spent in eating meals

MEAL	GROUP	MEAN SCORE	STANDARD DEVIATION	STANDARD ERROR	STANDARD DEVIATION OF THE DIFFERENCE	DIFFERENCE STANDARD DEVIATION OF THE DIFFERENCE	CHANCES
Breakfast.....	Experimental	24.32	3.4913	0.8229	1.4016	0.0143	$\frac{5.1}{100}$
	Control	24.30	2.0787	0.5367			
Lunch.....	Experimental	21.57	5.1592	1.2160	1.3644	0.1246	$\frac{5.5}{100}$
	Control	21.40	2.3939	0.6189			
Supper.....	Experimental	20.91	5.8871	1.3876	1.3876	0.5116	$\frac{6.9}{100}$
	Control	21.62	3.7266	0.9622			

Comparisons of the two groups are made in terms of meals, since the amounts served at the three meals varied and the periods of time taken in eating them are therefore not comparable (table 9).

The results show that the C group had a slight advantage in two meals and the E group a slight advantage in the other. However, the differences are very small and they are not reliable.

Since this method showed so little difference between the two groups, it seemed worth while to find out whether the percentage of delay was greater in

two out of three meals was with the children who had never attended a nursery school.

Comparison of the food habits of the two groups as measured by the amount of food eaten. The third measure used, the comparative amounts of food eaten by the two groups, we believed would show any superiority in appetite or balance of diet in the experimental group. During the period of observation food served at the table was measured in rounded tablespoons where possible, and food from the kitchen in servings sufficiently constant in size

for comparative purposes. Counsellors were given some training in measurements and observations were superintended. The children took considerable interest in the experiment and in notifying the counsellor when they helped themselves to second servings of bread, etc.

We cannot compute the amount of food eaten in terms of calories and grams of protein, fat, or carbohydrate. The measurements of some foods (e.g.,

Except for the larger amounts of milk and potatoes eaten by the experimental group, the differences between the two groups are slight (table 10). The E group averaged 3.88 glasses of milk a day, the C group, 3.26 glasses. The intake of potatoes was 3.14 table-spoons a day in the E group and 2.54 in the C group. Differences in the averages of other foods were small. The E group ate slightly larger amounts of cereals, tubers, vegetables growing

TABLE 10

Comparison of the E and C groups in amount of food eaten (average per day for 5 days, 15 meals)

FOOD*	GROUP	
	Experimental	Control
Milk (glasses).....	3.88	3.26
Meat (servings).....	1.28	1.28
Eggs.....	1.07	1.36
Bread (half-slice or equivalent).....	5.88	6.15
Cereals.....	6.01	6.00
Potatoes.....	3.14	2.54
Tubers.....	1.65	1.63
Vegetables (grown above ground).....	1.35	1.26
Baked beans.....	0.64	0.47
Salad (servings).....	0.80	0.77
Cooked fruits (saucers).....	0.22	0.44
Raw fruits (whole or equivalent).....	0.34	0.67
Desserts (saucers).....	2.30	2.22
Tomatoes, stewed.....	1.44	1.31

* Measurements are in tablespoons unless otherwise indicated.

the number of glasses of milk) are useful as absolute measurements, but the necessity of grouping other foods under one heading made arbitrary equalizations necessary (e.g., one piece of corn bread was equated with two half-slices of wheat bread). These equalizations were made by nutritionists on the basis of estimated rather than exact caloric content. However, the measurements are fairly satisfactory for purposes of comparing the two groups.

above ground, baked beans, salads, desserts, and stewed tomatoes; the C group slightly larger amounts of eggs, bread, and cooked and raw fruits. The reliability of these differences has not been determined, but probably many of them are not significant. The meat intake was the same for both groups. The larger milk and potato intake of the former nursery school children may mean only that the four adolescents of this group (as compared with two in the control group) ate

large quantities of these foods to make up the large food requirements of this period.

So far as there is an advantage, it appears chiefly to favor the E group, though the difference might be reversed in another group of the same size. There does seem to be some evidence that the children who had attended nursery school had better appetites for milk and all kinds of vegetables, foods which the nursery school especially emphasizes in training the children in food habits.

Such a study of the amounts of various foods eaten, especially in relation to food preferences and the different classes of foods, seems to offer the most profitable measure in continuing a study of the two groups. The situation at the camp was not entirely favorable for disclosing these differences, since the children were not allowed to eat just as they pleased or to go on "food jags," but were expected to eat some of all the foods served.

Food habits in relation to age, physical condition, the food habits of siblings, and the recency and duration of nursery school training. Younger children are much more amenable to training in food habits than are older, preadolescent children, who are far more independent in this matter. During the first three weeks of the camp season the children older than the average age of the group had lower scores on the Food Habits Rating Scale than the younger children had, in both the E and C groups.

	E GROUP	C GROUP
Older children	7.16	7.56
Younger children	8.06	7.67

Owing to the small number of cases, the significance of the differences has not been calculated.

Physical condition as shown by weight appeared to have no necessary relation to the food habits of the children. Thus, all of the 4 children, 2 in each group, who were 10 per cent or more underweight according to the Baldwin-Wood standards, had excellent appetites and rated high on the Food Habits Rating Scale. Inversely, none of the children who presented food problems was as much as 10 per cent underweight. Again, of the 4 children who were 10 per cent or more overweight, all in the C group, 2 were food problems. Possibly there is a physiological determinant of appetite which, though it does not show up in the weight of the child, has more effect than any habit training given the child. However, if the two groups were large enough chance would distribute this factor equally between them, and any advantage of nursery school training would still show up in the superiority of the E group.

There was a striking degree of similarity in the food habits of the siblings at the camp (table 11). Both members of three of the six pairs at the camp were food problems as judged by low scores on the Food Habits Rating Scale. One member of each of these pairs had attended nursery school and one had not. Both members of 2 pairs, all members of which had attended nursery school, had excellent appetites and few or no food prejudices. Only one pair differed within itself, the older child, who had attended nursery school, being a difficult child at table, the younger, who had not, offering no trouble at all.

If the total number of children in the study were not so small, these results would justify the conclusion that, as common sense would tell us, the home is far more important in determining habits and fixing attitudes than the nursery school is; for in 4 of the 6 pairs of siblings, one of the children had attended nursery school and the other had not, yet in 3 of these 4 pairs both

nursery school and the more recently he had left it, the greater was the probability that the nursery school had been able to shape the child's food habits according to its standards. With respect to the factor of recency of leaving the nursery school, we found that of the 8 children in the E group who were classified as food problems for the purposes of the study, 3, or 37.4 per cent,

TABLE 11

Comparison of the food habits of six pairs of siblings in relation to nursery school and camp experience

KEY LETTER	FOOD HABITS	AGE (YEARS AND MONTHS)	NURSERY SCHOOL EXPERIENCE	PREVIOUS MERRILL-PALMER CAMP EXPERIENCE
L'	Difficult	8-4	None	None
L	Difficult	6-5	3 semesters	None
J	Difficult	9-3	3½ semesters	None
J'	Difficult	7-10	None	None
B'	Difficult	10-1	None	None
B	Difficult	6-3	6½ semesters	None
N	Difficult	9-11	2½ semesters	One season
N'	Excellent	5-11	None	None
Q	Ate too fast; enormous amount	12-9	½ semester	One season
G	Are slowly, but very reliable	7-8	4 semesters	One season
M	Ate too fast; great quantity; no dislikes	13-0	3 semesters	None
C	Did not delay, few dislikes, quantity less than average	10-7	6 semesters	One season

children were food problems, and in the fourth it was the child who had attended nursery school who presented a food problem.

In one way, this is only to say that the home has a greater influence than the nursery school because it has the child over longer periods of time, which is a basic factor in habit formation. Corollary to this result is the finding that the longer the child had been in the

had been gone from the nursery school a shorter time than the average for the group (4.38 years), while 5, or 62.6 per cent, had been gone a longer time. In the matter of length of attendance, 3 of the 9 children who had attended two years or more were food problems at the camp, while 5 of the 9 who had attended less than two years were food problems. Thus it appears that the food habits of a child who has attended

nursery school less than two years, or has been out of the nursery school four years or more, or comes from a home where there is no adherence to nursery school methods of training, are not likely to be superior to those of a child of similar socio-economic status who has never attended nursery school.

SUMMARY

Thirty-three children of school age, 18 of whom had attended a nursery school and 15 of whom had not, were observed at a summer camp for a period of six weeks to determine whether the eating habits of the former nursery school children were superior. The group of former nursery school children had a slightly higher mean age, mental age, and IQ, and a few more boys, presumably giving them a slight advantage in such a study. The non-nursery school group had a slight superiority in socio-economic status. Comparisons were made on the basis of a rating scale, the time spent in eating (i.e., finishing) meals, and the amount of food eaten. Some consideration was also given to food habits in relation to age, physical condition, the food habits of siblings, and the recency and duration of nursery school training.

While only tentative conclusions can be drawn from a study based on so few cases, the children were observed so closely and the conditions under which they were observed were so favorable that the results are reported with a good deal of confidence in their reliability with respect to this particular group.

1. There was little difference in the food habits of the two groups. About

as many children in one group as the other had faulty food habits. There was little difference in the time taken to eat meals, and about as many children in one group as the other tried to avoid finishing foods they disliked by employing delay devices. There was little difference in the amount of food eaten. There was some evidence that the nursery school group ate more milk and vegetables and the non-nursery school group more eggs and bread.

2. There seems to be some ground for concluding that a long period of attendance at nursery school is more favorable than a short period in the forming of good food habits. However, even long attendance ($6\frac{1}{2}$ semesters) does not guarantee that the child will have good food habits.

3. There is also some indication that the more recently the child has left the nursery school, the more likely is his training to be evidenced in good food habits; and, similarly, the longer the time since his attendance, the more likely is he to have faulty food habits.

4. The faulty food habits most common among the children were: a dislike of particular foods or foods prepared in a particular way; a reluctance to finish the entire amount of food served; too much talking at meals, interfering with eating; overfondness for sweets and starches; and bolting food.

5. The food habits of children from the same home are likely to be similar, even when one of a pair has attended nursery school and the other has not. This resemblance is greater than that among nursery school children in general and much more striking than the

difference between nursery school and non-nursery school children. Thus it may be concluded that the home is a much more important factor than the nursery school in forming food habits and attitudes.

REFERENCES

- (1) CAMPBELL, ELISE HATT: The nursery school child grows into preadolescence. March, 1933, *Childhood Education*, **9**, No. 6, pp. 297-300.
- (2) Information for parents of children admitted to the Merrill-Palmer nursery school. 1928, Merrill-Palmer School.
- (3) TAYLOR, MARIAN W., AND FRANK, GERTRUDE G.: An experiment in nursery school follow-up. May, 1931, *Childhood Education*, **7**, No. 9, pp. 474-81.
- (4) The Merrill-Palmer School: Report for 1929-30 and 1930-31, pp. 297-300; report for 1931-32 and 1932-33 (unpublished).
- (5) THURSTONE, L. L.: Attitudes can be measured. Jan. 1928, *American Journal of Sociology*, **30**, No. 4, pp. 529-54.
- (6) WHITE, EDNA NOBLE: The objectives of the American nursery school. April, 1928, *The Family*, **9**, No. 2, pp. 50-1.

Habit Formation and Hygiene¹

OMAR C. HELD

THE mental hygiene movement is now immediately concerned with the prevention of minor maladjustments which impair the efficiency, health and happiness of the individual who is not a likely candidate for institutional treatment.

It seems that this more recent phase of the mental hygiene movement places a particular responsibility upon parents, teachers and others who are responsible for the training and education of children. This recent phase of the mental hygiene movement is largely educational in its scope as the individual is largely what he is because of the habits which have been developed. Closely integrated personality traits even, such as honesty, fairness, selfishness, perseverance and domination often show a lack of consistency which betrays their inner nature as being not a simple single trait but rather bundles of specific habits. The possible influence of predisposing qualities of physique, or chemique if you will, in the accumulation of these habits need not be denied.

A little contact with psychological clinics soon convinces one of the very close relationship between learning and hygiene. The maladjusted children and adults who find their way into the clinics are to a very large measure in their present condition of bad health,

unhappiness, and failure because of the kinds of reaction systems which have been developed. Some are apt to think that only the feeble-minded or the so-called abnormal find their way to a clinic. As a matter of fact in one psychological clinic less than eleven per cent of the cases over a period of two years were diagnosed as feeble-minded; and as for their abnormality, it must certainly not be accepted as the underlying causative factor or condition. It would be closer to truth to suggest that these persons are, indeed, psychologically normal in their reactions. If their behavior symptoms were not what they are after the particular experiences they have had, we should be more ready to suspect abnormality as a background. The distorted personalities and eccentricities of behavior among these subjects are more clearly effects than causes. They constitute, in large measure, reaction systems which have been built up through the circumstances of daily life.

Averill in his *Hygiene of Instruction* partially recognizes this fact when he says:

We are what we are, largely because we have practiced being that and not something else. Other things being equal Saint Francis of Assisi could have become as Machiavillian as that cunning Schemer himself, had he developed the art of practicing subtleties and trickeries instead of compassion and sympathy among his fellowmen. Nero might have become the most enlight-

¹ Reviewed from *The Growth of Ability* by Filter and Held (2).

ened monarch of antiquity if he had chosen to practice constructive, rather than destructive statesmanship, and the three wise men of the Gospels might as easily have become the most foolish men had they applied their hearts to folly instead of unto wisdom. The sequence is invariable; repetition of the same response to the same recurring situation adds one more hammer blow to the building in of character. A way of reaction hit upon or consciously reasoned out fosters identical reactions tomorrow, and the next day, and the next year. Only a sharp set-to with one's self will lead to the modification of character traits to any perceptible degree.

Averill thus forcibly demonstrates the importance of the type of habit formed in character development but he possibly grants too much power of choice in the matter to the individual both as to the type of habit formed and the modification of those present. It does not seem necessary to concede so large a purposive element in habit formation. Circumstances doubtlessly shape the decisions as they shape the consequences of those decisions in the individual's life. The habit conditioning is from the outside, and the individual more often follows than he leads himself into the particular direction which is taken.

The program of the clinic, after a diagnosis has been made, is two-fold. The first phase is that of reëducation, of breaking down the socially undesirable habit or unfortunate attitude and building up the type of habit response which makes for better adjustment. This is an important task, distinctly worth-while from the view of society and of the individual; but the habit clinic program must be bigger than this. If its work were to stop with the task described, we should find ourselves in a predicament somewhat like that re-

ported of an old village "where the council placed an ambulance, a doctor, and a nurse at the bottom of a cliff from which travelers often had the misfortune to fall. It was their duty to hurry the unfortunate victim away to the hospital for repairs. This sufficed until one alert citizen suggested that were a fence put at the top of the cliff no one need fall over." The absurd little story suggests that if the psychological clinic's educational system stops with reëducating and reclaiming the maladjusted we are still in the ambulance stage in our practice.

Another consideration which makes further attack upon the problem necessary can be illustrated by the case of a twelve-year old boy who was brought in for an examination because of speech difficulty. For some reason, which need not concern us here, improper habits of speech were built up in this child when he learned to talk, so that no one could understand him though he talked glibly enough. He was now at the adolescent stage where he was beginning to be aware of his shortcoming and ashamed of his inability to speak as other children did. An examination revealed the fact that the organs of speech were intact, and after four weeks of tedious teaching he was able to make any sound or pronounce any word. Only in conversation was he still inclined to drop back into the old habits of speech. This whole process of correction, while often successful in a reasonably short time, is ever painful and tedious. It presents the annoyance and the difficulty which is encountered whenever any established habit needs to be broken. The principle by which it can be broken is clear,

but the task of breaking it usually involves a battle preferably to be avoided.

The demand is urgent, then, for this other part of the program of the psychological clinic, which is that of prevention or hygiene. It is very clear that had some expert been consulted in the case of the boy with the speech defect when he was learning to talk, or had the proper precautions been taken to see that the correct habits of speech were developed in the beginning, much annoyance and tedious effort would have been spared later.

Medical science has learned to recognize the same need. Medical practice of the past was largely treatment of conditions which already existed, whereas a big part of medicinal practice today is preventive medicine, or hygiene. Periodic examinations are advised and everything is being done to combat the conditions which make for illness. Free clinics and dispensaries put this service within the reach of the masses. A similar program is necessary in mental hygiene. Perhaps a separate category of "mental" hygiene would not be necessary were it not for the fact that certain phases of emotional, sexual, educational and vocational adjustment are not ordinarily considered in a hygiene program. In other words, a program of hygiene for the whole individual is advised.

The program, though involved, may be described simply enough as the single task of seeing that the right kinds of habits are built up. William James (5) saw the very close relationship between habit formation and good hygiene in his well known statement that "the hell to be endured hereafter,

of which theology tells, is no worse than the hell we make for ourselves in this world by habitually fashioning our characters in the wrong way. Could the young but realize how soon they will become mere walking bundles of habits, they would give more heed to their conduct while in the plastic state. We are spinning our own fates, good or evil, and never to be undone."

Healthful and successful adjustment to life depends upon the kinds of habits which are formed. One is soon made aware of this relationship when he comes in close contact with the maladjusted. These unfortunates have had to endure much unnecessary delay in securing assistance in the meeting of their problems because of the common assumption that heredity is in large measure responsible for the maladjustment. Whatever contribution heredity has to make has already been made and cannot now be altered to any appreciable degree. The contribution which education or a program of mental hygiene can make is to guard against improper conditioning and to aid in building up those responses which make for health, happiness and all round successful adjustment.

SIGNIFICANCE OF THE CONDITIONED REFLEX IN PHYSICAL AND MENTAL HYGIENE

A man of no scientific training but with some interest in statistics was looking over some government reports and saw where it was estimated that ninety per cent of all human ills were due to constipation. He went to a pharmacist and asked that he prepare a mixture which was a sure cure for constipation; this was done. He put

it on the market and advertised it as a sure cure for ninety per cent of all human ills and became wealthy from the sale.

I wonder if we might not urge in a somewhat similar fashion that ninety per cent of all our ills are the result of improper habits of elimination, recreation, eating, sleeping, and working, and that by properly conditioning the child in these respects we should achieve the grand panacea. Probably all recognize this principle, but in its application fall short. Economic and social facilities may not be available to develop the right kind of habit patterns even though we did know which were desirable from the point of view of most complete adjustment of the individual. However, a hygiene program must take into account the place of learning in making for effective living.

The thing which makes it extremely difficult to determine what kinds of responses should be built up in a child to make for the best all-around hygiene, is the difference of opinion as to what should be the goal of education or the ultimate objective toward which the individual should be trained. It seems sometimes, as though the psychologist shows little hesitation before the weighty problem of choosing an objective. With a brazenly positivist air, he adopts the hedonist ethics and insists upon making mankind happy and contented if nothing else. The delight in effective adaptation to things-as-they-are is made to appear mankind's salvation. Let the psychologist have his way and every malcontent will be reeducated, every emotional zealot will be calmed—the world will be made safe for *status quo*!

But let us be lenient. The practice of correcting individuals must begin sometime, and possibly adaptation to a questionable present state of the environment is no worse than adaptation to other conceivable and also questionable ideal situations. And, after all, change and reform may still be confidently expected even among people successfully delivered from the shackles of excess emotionality, whether of ecstasy or depression.

To show something of the importance of habit formation in connection with mental hygiene, let us survey some examples of the deleterious influence of improper conditioning. Pedagogically, this is not the correct approach according to hygienists because mental hygiene should be positive and not negative; we should point out the conditions making for good hygiene. However, it is sometimes easier to emphasize the correct method of training by pointing out the incorrect. If we take as example a child who has been properly stimulated, and favorably conditioned, it is difficult to make people realize that this child is not instinctively or naturally the kind of person who would be well adjusted; but if examples of unhygienic conditioning can be taken, we can make our demonstration more convincing by illustrating the improvements brought about through reconditioning.

Habits of sleep and hygiene

It is not our purpose to go into the various theories of sleep here, but to point out the need of building up right habits of sleep. It may also be profitable to see what obnoxious and harmful substitute stimuli may be-

come necessary for sleep, and what are some of the more desirable substitute stimuli which may facilitate the original conditions necessary for bringing it about. Since one-third of our life is directly concerned with sleep, and the degree of health, efficiency, success and happiness of our entire life is so closely associated with good habits of sleep, Burnham thinks that in developing good habits of sleep in a child or adult, we are making our greatest contribution to his somatic and mental hygiene.

Perhaps many people do not realize fully the importance of the rôle which substitute stimuli play in sleep. Whatever the original conditions may be which beckon us to sleep, others readily get "hooked in" and become such an integral part of the total situation necessary for sleep that they grow indispensable. Since this is true, care should be exercised that these be desirable substitute stimuli or at least convenient ones. Generally speaking, conditioned stimuli of darkness, good posture, sight of bed, closing of eyes, fresh air, and relaxation, are desirable as promoting the health and well being of an individual, while food, alcohol, veranol, sulphanol, trianol, a given bed, a definite blanket, a light, rocking, singing, presence of a parent, a pacifier, absolute quiet, sucking a finger, are examples of objectionable conditioning stimuli.

It is not necessary to go into the details as to how these conditioned stimuli become effective. Like the dependence of the adult upon a drug taken to alleviate suffering or to induce sleep upon occasion of excitability, so has grown the child's dependence upon

a particular baby blanket or absolute quiet in the room. Many parents fail to appreciate the fact that the child can as readily be taught to sleep in a darkened room as in a lighted one, and without the aid of any rocking, singing, or use of a pacifier. It is, furthermore, not generally realized how early in the cradle these substitute stimuli may be built in, nor how firmly established they become if allowed practice. It is not through a sudden or alarming coup d'état that these little rascals become the absolute tyrants who make parents conform to the conditions necessary for sleep.

It is not only possible to build in substitute stimuli to facilitate sleep but we may also build in conditioned stimuli for going to bed. There need be no argument at night between parent and child as to when the child should retire at night or whether or not the child should take the afternoon nap. If there is any argument on the part of the child the responsibility is not that of the child. Homes are not as scarce as may be supposed where the little tots prepare for an afternoon nap, or at eight thirty go to bed, without thought of preliminary debate. One Pittsburgh psychologist has hit upon the expedient of letting the alarm clock send his boys to bed in the face of distractions. How utterly different this picture is from the kind presented in the ordinary home, where every afternoon nap and every evening's retirement is preceded by arguments, objections, tears and anger.

Right habits of eating and hygiene.
There is scarcely need to comment upon the importance of proper habits of eating and digestion upon health,

but it is worth while to recall the part that learning plays in establishing the eating responses that we have. The child at birth has a rather simple repertoire of feeding reactions. Whether wholesome or unwholesome habits develop is dependent upon the parents or those intrusted with their upbringing. It is not our purpose here to argue the needs of a balanced diet, of chewing rather than bolting the food, of eating at proper intervals, and eating proper amounts and kinds of food free from emotional strain; our interest lies in observing the relationship between these factors and hygiene.

Burnham (1) has aptly set forth the fact that eating responses become conditioned:

Accustomed surroundings become conditioned stimuli and make for a better secretion of digestive juices. Better digestion results in the case of most individuals when agreeable companions are present furnishing conditioned stimuli, and with other individuals solitude may furnish conditioned stimuli that aid digestion. A vast number of accidental and accessory circumstances may become conditioned stimuli—attractive furniture, beautiful dishes, flowers, views from the windows, conventional serving, and many others. Equally significant are the unfortunate conditioned stimuli which often result from improper food, bad service, lack of cleanliness, and the like.

Many of the idiosyncrasies of an adult in his likes and dislikes for food, and general habits with respect to food, may be better understood if we know something about his training. This is notably true of the sometimes more determined attitude of the child toward his food. Where we have refusal to take food, vomiting of food,

aversion to new food, we may rest assured that the child is not willfully trying to provoke the parent by such behavior. Many of these are much better understood if we know something of the kinds of experiences a child has had. Organic factors must always be considered in dealing with refusal to take food or aversion to new food, but once this is discovered to be non-interfering, improper conditioning with regard to that food should be investigated. One person's dislike for milk was pretty definitely traced back to childhood where the aversion to milk grew up as a result of seeing the very unsanitary conditions under which the milk was handled.

Adults as a rule do not appreciate the effect of early habit formation and are undisturbed by the two and three year old's insistence upon having his dessert first, or his refusal to eat from any other than a certain dish. When the child grows to be seven or eight he will probably be punished for these acts. Then he is supposed to know better. But a child does those things he has been taught to do. This is nicely illustrated by the behavior of the five-year old daughter and two-year old son of a friend. Robert insisted upon having more meat, and when his mother told him he had already had all he should have, he began to cry. His tears were ignored and he was on the point of accepting the ultimatum but five-year old Jean advised him to just keep on crying a while longer and he might have what he wanted.

If adults who have the responsibility of training children realized the importance of habits for mental hygiene,

and were aware of the fact that many of these habits are formed so early in life, much could be done to make of the child a better adjusted adult.

Reaction and elimination. We are apt to think of the elimination process as being such a deep-seated physiological process as to be totally uninfluenced by learning or conditioning. It would be a boon to mankind if this were true, because so much of his later achievement depends upon the proper functioning of this and other physiological habits. The learning involved in physiological processes is often overlooked. The studies of Pavlov on the conditioning of salivary and gastric glands was accepted by students eagerly as a means of explaining how learning proceeds; but in their eagerness to make applications of this principle in the emotional manual and verbal learning, the students have overlooked the part it plays in what might be termed learning on the physiological level. Further experimentation upon the other glands of external and internal secretion will no doubt reveal the fact that secretory responses become attached to substitute stimuli along with circulatory, respiratory, and elimination responses. One can scarcely fail to recognize the great importance from the standpoint of hygiene, of properly conditioning these physiological processes to stimuli which make for health.

In the conditioning of the excretory responses of a child, we get insight into the problem of learning, and see where substitute stimuli get built in and become a necessary part of the total situation necessary for the response. It is very necessary then, since proper habits

of elimination are so essential to health, that proper substitute stimuli get built in. It is unfortunate that in many of our neurasthenics, drugs have become substitute stimuli instead of proper eating and exercise. This is so universally true that practically every restaurant, dining car, and news stand dispenses phenomints and aspirin tablets. One bad feature of this is the adaptation to laxatives which necessitates larger and larger amounts. This condition has probably come about as a result of the sedentary lives of people whose daily routine allows little opportunity for recreation and exercise. Some European nations have realized the gravity of the situation and have attempted to combat it by scattering gymnasiums in all parts of the country to make more easily available facilities for proper exercise.

Undeniably, we have referred here to a major "curse of our modern civilization" as the druggist would remind us, one which is to be lifted however, not so effectively by drugs as by habit formation and dependence upon exceedingly available conditioned stimuli such as time of day or others which are as readily accessible.

Emotion and hygiene. Watson (6) in his genetic study of emotion has given us a good account of the place of conditioning in our emotional reactions. He has shown that there are relatively few original adequate stimuli to emotional responses. There is no natural fear of the dark, fear of going insane, but fear responses become attached to these situations as a result of experience or learning. The same condition prevails with regard to other emotional reactions.

It is our purpose here to examine the relationship of this emotional conditioning to the hygiene of the individual.

Many who have encountered the fascinating volume by W. B. Cannon on *Bodily Changes in Pain, Hunger, Fear and Rage* will recall the utility theory of emotions urged by Cannon, which stresses the biological importance and survival value of bodily changes in emotion. The value of this great release of energy with emotion in the life of man may, however, be questioned. Watson has suggested that possibly under more nearly primitive conditions of life the emergency theory held true. On the contrary it may be suspected that even in those days victory went to the cool-headed; and certainly under our present system of human relationships the value of strong emotional responses is ever of doubtful value from the point of view of hygiene.

We still have the physiological adjustment for overt behavior of the "emergency meeting" kind, but in addition to the stimuli calling forth these physiological responses, we also have social stimuli which are stronger and which prevent overt expression being given to all this preparation for conflict. This does not make for good adjustment or hygiene but in some respects represents a break-down phenomenon.

The unhygienic effect of intense emotion under present social conditions is well illustrated in the case of a colleague who had a landlady who constantly did and said things which aroused his emotional mechanism for overt offense; but social usage dictates

that a gentleman will not strike or even swear at a lady. Thus he was denied any overt response, but his digestive movements and secretions were interfered with to a degree which brought on a condition of indigestion. The general effect of intense emotions of anger, excitement, fear, sorrow or extreme joy, is to interfere with adequate digestion, and it is unhygienic. So any conditioning which builds in new situations which are capable of calling forth intense emotional response does not make for good adjustment.

It seems that the katabolic phase of metabolism is speeded up during intense emotion and certain of the visceral organs are made to function excessively. Undue amounts of blood sugar are liberated, and in general intense emotion is disintegrative to the visceral organs, to say nothing of its deleterious effect upon skills and capacity for acquiring skills. Gates (3) points out the fact that strong emotions do have an energizing effect and as such are an aid to changing habits, but they are much like drugs used for a similar purpose; they are habit-forming and if visceral responses are relied upon to change behavior, we more certainly need them the next time. Even the tender emotion of love and sympathy of the mother for the child may be unhygienic and a hindrance to good adjustment, if over-indulged. Most of us have come in contact with the "mama" boy who has had an abundance of love inflicted upon him, thus making him incapable of adequate adjustments.

In summarizing, we can say that the important thing for parents and those

responsible for the hygiene of childhood is to keep the child relatively free from situations calculated to become stimuli for intense emotional reactions. Second, where such emotional attachments have been built up, break them up before too much opportunity for practice has been given. The best means for this has been found to be the principle of reconditioning.

Parents are likely to overlook and minimize the fear and other emotional responses of childhood, especially the seemingly absurd situations which call them forth. Whatever a parent is able to do in preventing so many situations from calling out intense emotional responses, or whatever can be done to counteract or break such connections will do much to promote all round hygiene.

Other habits of successful adjustment and hygiene. A great deal of attention has been given to the part that heredity plays in maladjustment. Studies have been made which purport to show that a large percentage of our delinquents, dependents, unmarried mothers, and inmates of our prisons are recruited from the ranks of the feeble-minded or at least from ranks below the average level of developability. In more recent studies the influence of home conditions, neighborhood, companions, and other community factors have been investigated to see what part they play in building up habits which make for maladjustment. There is a growing feeling that the delinquent, the truant, and the criminal are psychologically not abnormal persons but that their type of behavior just as surely as that of their more fortunate fellows is in large meas-

ure determined by the circumstances under which they have grown up. Were it possible actually to get a measure of the level of developability of all persons who violate law or who are in any way failing to make adequate adaptations, that measure would, according to the opinion of some authorities, approximate a normal distribution curve.

Without realizing it, many have made the criterion of normality the degree to which a person is conforming to social customs and usage. We must remind ourselves that normality is a statistical concept and not a psychological one, and that habits of non-conformity are learned in exactly the same manner as are habits of conformity. Cockney and the King's English, profanity and prayer are modes of response which are learned in the same manner.

The Hygiene Clinic proceeds on the assumption that the child is born neither inherently bad nor inherently good, with tendencies neither toward criminality nor saintliness, but just born. If it is thought desirable to have responses of conformity to social usage, they must be taught to the child. There is no intention here to deny the part played by defective structure or malfunctioning of physiological processes in making for inadequate adjustment, but the reminder is added that even in cases of physical handicap, the particular direction of behavior will be determined by experience.

ROLE OF PARENTS AND TEACHERS

As has been previously stated, at the present stage of our knowledge con-

cerning these matters, it is easier to point to negative procedure than to positive. No one can lay down a definite regime which will result in a child developing a well integrated personality. The great complexity of situations confronting a child in the course of a life time precludes any attempt to lay down any formula for any given child. Only a few big general principles may be laid down, which if coupled with some knowledge of growth and habit formation may be of aid.

One thing of fundamental importance in making for a well integrated individual is the pursuit of some definite interesting tasks, preferably real work which is socially valuable. The age at which such tasks may be found, which shall bring about active response on the part of the child, is an earlier age than is ordinarily regarded possible. The task must, of course, be somewhat within keeping with the child's level of development. If tasks of too great difficulty are held up to a child we are certainly not building for sound hygiene. Our regimenting educational machinery has long been recognized as an unhygienic factor because of its attempts to fit all children to the same mould, thus contributing to maladjustment. A surprisingly large number of our social misfits were aided in arriving at their present unfortunate situation by rigid curricula not adapted to their needs. The circumstances are being corrected, but children still repeat grades, play truant whenever possible, and in every conceivable way try to avoid what is to them a disagreeable situation; and thus habits of delinquency and failure

are established where we want habits of success.

Preoccupation with worthwhile tasks, furthermore, takes time. This is a matter particularly important for out-of-school hours when play-time is largely idling-time—grand opportunity of the theologian's devil. Let us not solemnize the occasion of a little happy mischief, however, nor picture life as only social duty, pleasurable though that may become. So long as the visitor from Hades manifests himself in boisterous overt activity—in *extroversion* let us say—then only parents, not the psychologist, need worry. What has been widely portrayed as the psychologist's pet alarm is this devil when he appears in quiet form—when habits of *introversion* arise (3). These are without a doubt combated most successfully through our suggested device of crowding them for time in which to develop.

Directly in keeping with this first general principle is a second one, that of supplying adequate opportunity for contact with other children. The ability to make adequate social adaptations is an important phase of one's education, and has an integral connection with hygiene. There are individuals with abilities of a high order in some lines, who yet fail miserably because of their inability to adapt to people and social institutions. Here again some care must be exercised in providing social groups of a level that will enable the child to build up habits of confidence in meeting and competing with other people. Provision or control of the social environment in accordance with this suggestion is indeed difficult, but the very obvious

and yet common violation in the form of pretentiousness or over-ambition, especially as children grow older, can be avoided.

It is obvious that some adult direction is necessary in carrying out such general principles as those suggested above. The child needs some assistance in having his task or work set out for him, some direction given for attack, but withal a degree of freedom in realizing the successful completion of his task. The difficulty for most parents and teachers is to know how much direction to give to the child in outlining his tasks and planning for their accomplishment. We frequently have the overzealous parents who, because of their strong emotional attachment for the child, or as a means of realizing their own ambitions, make all social adjustments for the child.

It might be insisted, as another positive principle in a program of hygiene, that a child should be taught frankly to meet and overcome difficulty and failure. A child doesn't naturally have this ability, and if overzealous parents go ahead smoothing the way and never allowing adequate opportunity for single-handed meeting of difficulties, this ability will not be found in the child's repertoire of skills. One example will suffice. Mrs. Z. brought her twenty-seven year old son to summer school to register him. She was very anxious that he make good. She reported that he was a very good boy who had never in his life given her any trouble. The mother did all the talking and all the arranging, the boy was given no opportunity to express himself. This smooth manner of getting things done had apparently been

going on from the beginning of the boy's life. Is there any wonder that when left alone he was helpless? We cannot do things well which we have not done before, and if habits of standing-alone, of making our own social and other adaptations, are not given opportunity to be developed, we must not expect them to appear in full bloom out of nowhere. L. S. Hollingworth has repeatedly emphasized the importance of psychological weaning of the child in her book, *The Psychology of Adolescence*.

Another fairly frequent occurrence is the incident which builds up habits of superiority in a child: where the child fails to get along with playmates, the playmates are always to blame. Mother's "precious" should not play with them. Later when school life begins and the young child does not meet requirements or cannot adjust to the schoolroom situation, the teacher is to blame; Junior, or the type of training Junior has received at home, is never thought of as even a contributing factor. Again, when his attentions to members of the opposite sex are not returned, mother is sympathetic and the girl is not worthy of her son. Is there any wonder such an individual is not capable of making a satisfactory adjustment in adulthood, when mother is no longer a source of refuge?

From the point of view of hygiene it is tremendously important that parents and teachers give all help necessary to the growing child but leave room for the child to fail occasionally if it teaches him to build up habits of meeting his own problems.

Care should be exercised that habits of failure are not developed by repeated encounter with tasks beyond his experience and background.

Happy indeed is the child of parents who are in a large measure able to objectify the problem of rearing him.

To the extent that they are not dominated by their sympathies, they may aid the development of essential habits and thus lay the foundation for good hygiene and a successful career.

University of Pittsburgh.

REFERENCES

- (1) BURNHAM, WILLIAM: *The normal mind*. New York, Appleton, 1924.
- (2) FILTER AND HELD: *The growth of ability*. Baltimore, Warwick and York, 1930.
- (3) GATES, A. I.: *Psychology for students of education*. New York, Macmillan, 1925.
- (4) *Indiana University News Letter*, 13, No. 11 (Nov. 1925).
- (5) JAMES, WILLIAM: *Principles of psychology*. New York, Holt, 1890, 1, 127.
- (6) WATSON, J. B.: *Psychology from the standpoint of a behaviorist*. New York, Lippincott, 1919.

Brief Reports

Laterality of Limb Movements of Four Newborn Infants

IN A study of the activity of four infants (1) the frequency of limb movements during the first ten days of life was observed. An analysis of these data in their bearing on laterality of limb movement is reported here. In collecting the data, arm

movements of the lower limbs were recorded in the same manner.

In order to determine whether the difference between frequencies of right and left arm movements was significant, the per cent which each contributed to the total number of move-

TABLE 1
Per cent of frequency of limb movements

INFANT	TOTAL LIMB MOVE- MENTS	SIMULTANEOUS LIMB MOVEMENTS	PER CENT	STANDARD ERROR	RIGHT LIMB MOVE- MENTS	PER CENT	STANDARD ERROR	LEFT LIMB MOVE- MENTS	PER CENT	STANDARD ERROR	DIFFERENCE RIGHT AND LEFT LIMB MOVEMENTS	STANDARD ERROR OF DIFFERENCE	CRITICAL RATIO
Arm movements													
1	4584	2561	55.8 ± 0.8	1079	23.5 ± 0.7	944	20.5 ± 0.6		3.0 ± 0.9	3.3			
2	2174	1674	77.0 ± 0.9	319	14.7 ± 0.8	181	8.3 ± 0.6		6.4 ± 1.0	6.4			
3	2103	1416	67.3 ± 1.1	301	14.3 ± 0.8	386	18.4 ± 0.9		-4.1 ± 1.2	3.4			
4	2990	1501	50.2 ± 1.0	832	27.7 ± 0.8	657	22.1 ± 0.8		5.6 ± 1.1	5.0			
Leg movements													
1	8604	5758	66.9 ± 0.5	1220	14.2 ± 0.4	1626	18.9 ± 0.5		-4.7 ± 0.6	7.8			
2	3060	2349	76.8 ± 0.8	443	14.5 ± 0.7	268	8.8 ± 0.6		5.7 ± 0.9	6.3			
3	2634	1916	72.7 ± 0.9	260	9.9 ± 0.6	458	17.4 ± 0.6		-7.5 ± 1.0	7.5			
4	3001	2040	68.0 ± 0.9	493	16.4 ± 0.7	468	15.6 ± 0.7		0.8 ± 1.0	0.8			

movements were recorded under three categories, movements of both arms together, of the right arm, and of the left arm. If both arms moved simultaneously, regardless of whether one arm moved faster or farther than the other, they were considered as a movement of both together. The move-

ments has been calculated. Yule's (2) formula for the standard error of a proportion has been used to determine the significance of the difference.

In table 1 are given the frequencies of limb movements and the percentages for both arms together and for right and left arm movements. For

all four infants there is a significant difference between the movements of the right and left arm. Three infants moved the right arm oftener than the left, and one infant moved the left oftener. The differences between the frequency of right and left leg movements are significant for only three infants. Two infants showed more left than right leg movements, and one more right than left. Infant 1, who moved the right arm oftener,

moved the left leg oftener. Infants 2 and 3 showed the same laterality for both arms and legs.

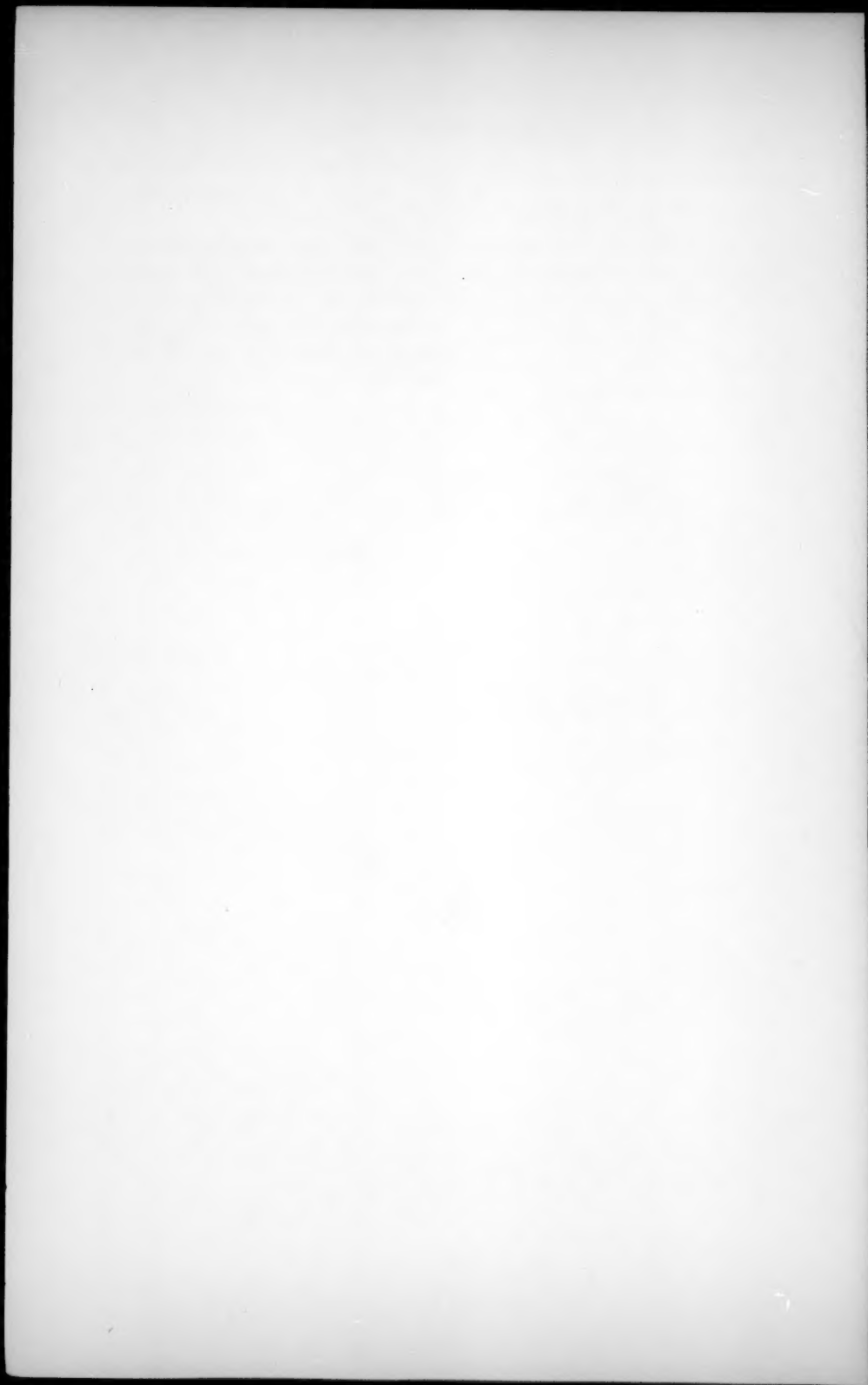
It is evident from these data that at the youngest age at which it is possible to observe infants there may be a significant laterality difference in frequency of movements of the extremities.

ESTHER STUBBS.

ORVIS C. IRWIN.

REFERENCES

- (1) IRWIN, ORVIS C.: The amount and nature of activities of newborn infants under constant external stimulating conditions during the first ten days of life. *Genet. Psychol. Monog.*, 1930, 8, No. 1, 1-92.
- (2) YULE, G. UDNY: An introduction to the theory of statistics. 5th ed. enl. London: Charles Griffin, 1919. Pp. xv, 398.



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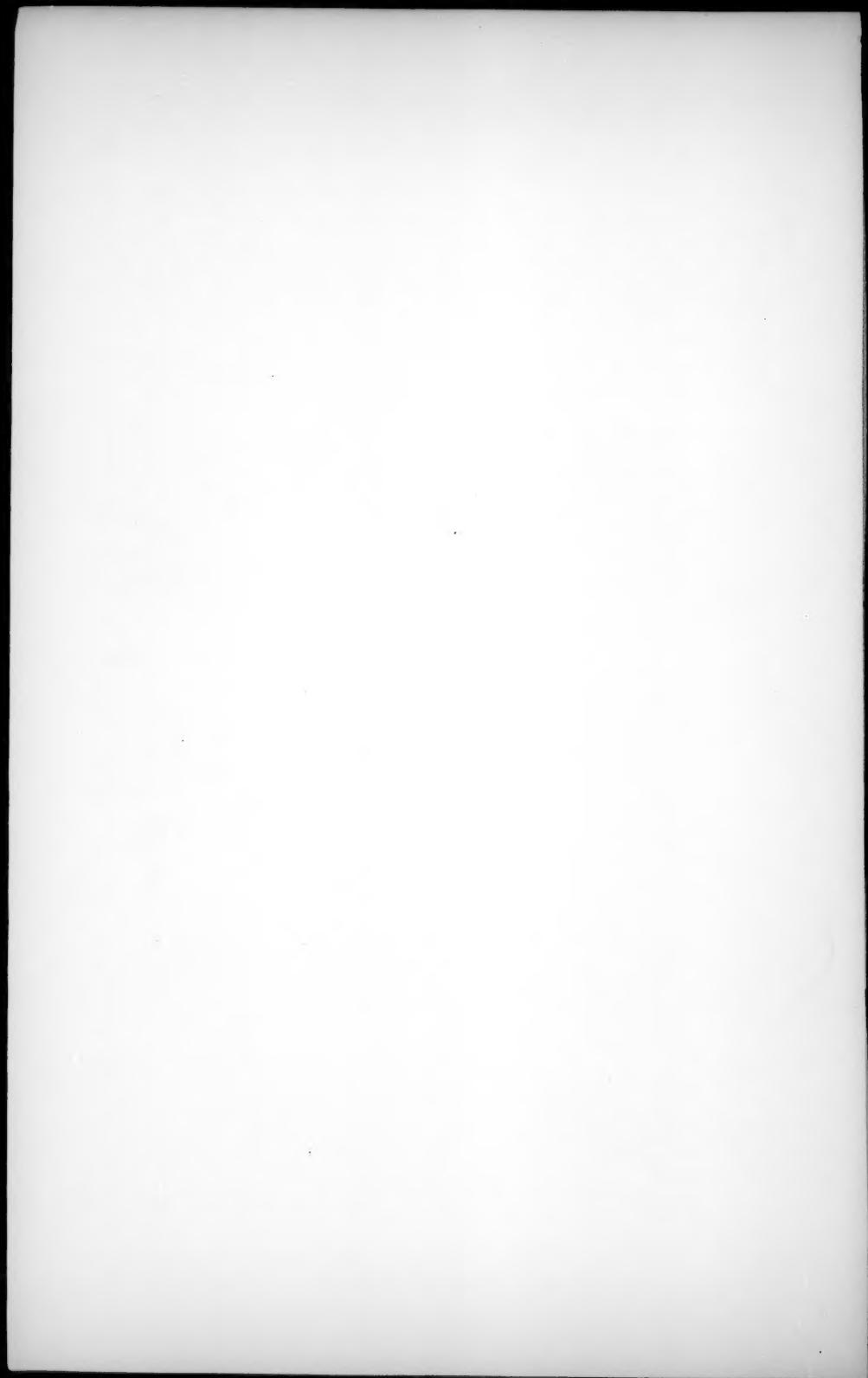
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